EMPIRICAL STUDIES ON STRATEGIC ALLIANCES IN THE AIRLINE INDUSTRY

by

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Preface

Major institutional, regulatory, and structural changes have occurred in the international air transport during the past decades. Many countries have deregulated their domestic airline industries and many open skies continental blocs have been formed in Europe, North America, and most recently, in Asia. International air transport has been substantially liberalized due to the diminishing role of IATA (The Air Transport Association) as an industry cartel, and via a series of liberalized bilateral agreements signed between many countries; including the U.S. and U.K. Increased liberalization and continentalization have induced major airlines to create global service networks through inter-carrier alliances. All these changes are intensifying competition between major carriers in both domestic and international markets.

Fierce competitions, together with economic recession in the early 1990s, led many airlines to massive financial losses and economic crisis, forcing them to undertake major restructuring to improve efficiency and reduce costs. Although it is important for an airline to map out proper strategies in the globalizing airline industry, the ultimate ability of a carrier to survive and prosper in increasingly competitive markets greatly depends on its productivity and cost competitiveness.

There are many researches available on the airline industry. Most of the research deals with deregulation, public policy issues, airline strategies and cost performance. However, there are very few studies which provide a systematic analysis of airline alliance competitiveness toward both of demand and supply side. Yet, strategic alliance is perhaps the most important strategy for each airline to survive in today and future worldwide competition. This is an important reason why this topic is chosen for my thesis. The study focuses first on an overview of airline industry including the history development, marketing, economics point of view and recent strategic trend, and then ends chapter one with research overview and planning. Chapter two elaborates on the history of airline alliances, the definition of airline alliance, and the type of each alliance such as marketing alliance and strategic alliance. These chapters also introduce a draft survey on regulations - especially on alliance -

commenting the airline's industry from the alliance strategic point of view. Then discuss about past researches in both managerial and economics point of views toward alliance. Chapter three presents the effect of alliance from the supply (airlines) point of views, which includes fundamental issues related to airline productivity and profitability. It also shows the effect of strategic alliance toward each airline's productivity and profitability. Chapter four and five are mainly from the demand (travelers) point of view. In chapter four, travelers' perspective, their carrier choice, and their willingness to pay are examined, as well as the benefit of alliance to travelers and how they notice and rate them as their airline choice factor. Chapter five is regarding the service quality of code sharing flights. This chapter shows us more idea on how passengers rate the service of each airline in different categories and what their satisfaction is on code sharing flights, which is one of the most important alliance benefits. This chapter is very important because it shows the linkage between the supply side and the demand side; as the code sharing is intended to reduce cost and/or gain more passengers. The final chapter, chapter six, concludes the overall strategic alliance effects from both airline and passenger sides and, further on, suggests airlines for valuable strategies they need to consider in response to the recent and upcoming trends.

The target of this thesis is to airline managers, government policy makers and regulators, academics, industry researchers and also to everyone who are interested in airlines or airline industry. Particularly, it can be guidance to both airline companies and to travelers on how to achieve utmost benefits from strategic alliances. Although this thesis limits its investigation to the issues facing the airline industry, it should be noted that the issues addressed and methodologies used in this study could be producing many useful results applicable to another industries or firms engaged in international business or any other service industry.

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In writing this Thesis I have been fortunate in two respects. First, from little my family has brought me oversea several times on many airlines. I do felt myself about differences between airlines. Second, nowadays the competition between airlines has become incredibly strong. A lot of airlines join Alliance and also I have a difficult time of judging which airline I will choose and what will give me the best profit opportunities. And at the same time, what gives the best output to each airline. So those are my inspirations on how to find out whether airlines' performance.

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However none is responsible for my mistakes that remain in this work.

Abstract

Nowadays, airline alliances dominate the air transport industry with the largest carriers belonging to one of the alliances. The corporate strategic trend has changed from bilateral agreement to strategic alliance. Even though researches had been done to evaluate the benefits of alliance formation, little was done on the effects of forming alliance on airline's performance, and little attention was paid on the consumer's perception of it. The objective of this study is to assess and describe to what extent airlines have reconfigured their alliance strategy, how these strategy changes have affected the airlines' performance, and how passengers cope up with the changing context of airline marketing-related strategic behavior.

This research is structured into three parts with each individual research question being evaluated by its own methodological and theoretical elaboration. The first part is based on the overview of airline alliances and past researches. The second part is based on the effects of airline alliances towards airlines' management, or the supply side. The last part is based on effects of airline alliances on passengers, or the demand side.

Regarding the supply side, this paper gathered data from 20 airlines between 1990 and 2004 and analyzed the effects of participating in alliances on an airline's performance through fixed effect modeling. The study reveals that strategic alliances have contributed significantly to productivity gains. Furthermore, strategic alliances left a positive impact on profitability.

On the contrary, this paper seeks to find the benefits of the alliance perceived by Thai travelers and what has driven their choices of airline via survey conduction. The results show that most leisure travelers have misconceptions towards the purposes of airline strategic alliance while only a small number have in business travelers. Moreover, business travelers significantly put emphasis on benefits when considering their choices of airline.

Besides the offered benefits, service quality is also considered very important among travelers. This paper further emphasizes on service improvement of code-share

airlines' by focusing on the gaps between customer's expectation and perception of airline service quality. A structural equation model was developed to analyze the structural relationships of passenger's expectation and perception gap, the overall satisfaction, fare, and future purchase intention. The results suggested that passengers' expectations and perceptions of code-sharing services differed mainly because of their past experiences. From structural relationships result also showed that passengers' satisfaction carried a very strong positive effect on 'purchase intention' as well as 'fare'. On the other hand, passengers who were satisfied with 'fare' factors might not repurchase code-share flights.

The conclusion chapter ties the various findings of this study and states how alliances become a vital strategy for airlines to survive and prosper in today's competitiveness. Alliances allow airlines to enjoy productivity gain and profitability, while increasing customer benefits in many ways. Therefore, airlines alliance needs to promote and market alliance benefits in order to build up customer royalty and to be selected as airline of choice based on benefits rather than ticket price. Given that customer royalty is gained, more demand is also gained which in turn provides higher income. One disadvantage of alliances is that it reduces market competition. However, such may not be entirely true since airlines that belong to the same alliance still fly and compete on the same routes without any code sharing.

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Chapter 1

Introduction

Introduction

The airline industry, the major sector of the world's infrastructure, has enormous economic significance. In 2003, the world's 896 scheduled airlines carried 1.657 billion passengers – equivalent to more than 25% of the earth's habitants – and 34.5 million tons of freight. The industry also carried almost 40% (by value) of the world's manufactured exports and 45% of the more than 714 million international tourists (2002 data). It is expected to assume an even greater importance over the coming years, especially in transporting freight which is expected to account for as much as 80% by value of the world by 2014.

According to estimates by the International Civil Aviation Organization (ICAO), the direct contribution of civil aviation (including airlines, other commercial air transport operations and their affiliates) was US$ 370 billion in 1998. Civil aviation makes an even larger contribution to the gross domestic product of developed countries such as the United States, where air travel forms an important part of business and personal lives (Tanejam, 2002). The sector is also becoming increasingly important for the residents of developing countries as air travel becomes more affordable.

The civil aviation industry also has an effect which goes well beyond its direct contribution, including surrounding industries that have some interdependence with aviation for example travel agencies, airports, and the range of businesses associated with air freight.

Considering the direct and multiplier effects of air transport, a total US$1,360 billion of output and 27.2 million jobs were generated worldwide in 1998. In terms of employment, the sector accounted for almost 6 million jobs, with 2.3 million people directly employed by closely related sectors such as air navigation service providers (1.9 million) as well as aircraft and other manufacturers (1.8 million).

For much of the last 30 years, the airline industry has simultaneously experienced falling income return (the sector's equivalent of prices) and increasing overall revenues, implying a greater volume in terms of trips undertaken by customers and the amount of freight handled. Even during the ten years leading up to 2003, when the decline in yields was the most significant (owing to widespread liberalization of the sector and the entry of scores of new players), the sector was able to raise its total revenues by 28% (see figure 1.1). Between 1991 and 2002, the scheduled airlines' traffic increased at an annual rate of 4.9%, a composite of passenger-kilometers, which grew at 4.3%, and freight ton-kilometers which grew at 6.5%.

Before examining the economics, the trends and the alliance imperatives of the airline industry, first the evolution and history of the industry will be described.

The first scheduled airline flight took off in 1912. During the first 30 years of development, the technology underlying the aircraft (which was based on the piston engine) placed severe constraints on the growth of the industry owing to several factors: low speed, low level of comfort, short range and low cost-effectiveness. During the 1950s, aircraft powered by turboprop engines were introduced, which dramatically improved the productivity and production capacity of the industry (see table 1.1). An even bigger technological advance in the form of the jet engine occurred in the 1960s, which boosted the further development of the industry.

Air travel was a luxury in many parts of the world in the past decades and, as a result, domestic travel within developed countries, such as the United States, formed by far the largest component of the industry. While the US domestic market continues to dwarf other domestic markets over the last two decades, international air travel has increased in many developing countries (especially in Asia Pacific) as their citizens become more affluent. This trend is evident from the following figures. Between 1980 and 1999, the growth in international revenue passengers-kilometers (RPK) and the number of international passengers was more than twice the growth in the world's gross domestic product (about 3%) and much faster than the growth in the overall number of passengers. As recently as 1991, airlines in North America and Europe accounted for 71.1% of the worldwide traffic, but this proportion had declined to 63.0% by 2002. Over the same period, airlines from Asia Pacific increased their share from 19.5% to 26.7%. The growth of airlines based in Asia Pacific has been phenomenal (see figure 1.2). Moreover, the International Air Transport Association (IATA) forecasts that the Asia Pacific market will account for 51.0% of the scheduled international passengers in 2010 (Oum1997).

These trends, specifically the rising importance of international travel and Asia Pacific markets, are expected to continue, perhaps even accelerate, owing to three key factors (Taneja2002).

First, continued strong performance of Asia Pacific economics will translate into a higher number of trips on a per capita basis for both business and leisure purposes. For example, in India and China, only one person in every hundred might take a flight during a year. This means the region has a huge potential for growth in the near future.

Secondly, demographics indicate that urbanization, a key predictor of the demand for air travel, is occurring rapidly in Asia Pacific economies. Residents of cities such as Singapore and Hong Kong undertake the highest number of trips on a per capita basis.

Thirdly, many of these economics are exhibiting rapid population growth, in contrast to the slow or negative growth in many developed countries, especially Japan and countries in Europe.

1. Airline industry problems encountered and resolution strategy

1.1 Government intervention

The airline industry is characterized by an unusually high degree of government intervention, especially for international air routes. The motivations behind government intervention include national pride, the strategic importance of the sector and the safety of passengers. Basically, many governments started national airlines since they believed that having a national carrier was a matter of national pride. Additionally, many governments consider air transport to be essential for the functioning of the country and its economy, and even a matter of national security. Finally, since a single aircraft may carry several hundred passengers, whose safety may be jeopardized by inappropriate airline policies, poor maintenance and safety standards, it is necessary for government agencies such as the US Federal Aviation Administration, to stipulate safety standards and oversee compliance by airlines.

Government intervention in the airline sector takes several different forms. Most airlines have to obtain approval from the home and host governments for the international routes served and the flight frequency. In fact, an elaborate categorization of freedoms determines what a particular airline can or cannot do in a foreign market (see table 1.2).

Constraints on flight routes and/or frequency are used by governments to protect their domestic airlines, as illustrated by the following cases:

Only three airlines, namely Cathay Pacific, British Airways and Virgin Atlantic, are permitted to operate flights on the busy Hong Kong -London Heathrow route.

As of February 2005, while Singapore Airlines flies as many as 80 times a week from Singapore to Australia, all its flights have to terminate in Australia and cannot proceed to the United States. Qantas, which has a 75% market share of the Australia-US routes and derives 41% of its international profits from these routes, is strongly opposed to SIA obtaining these flying rights.

Leaving aside issues of allowing full foreign ownership, governments often place restrictions on foreign ownership limiting investors taking equity stakes in their countries' airlines. For instance, non-US investors cannot own more than 25% of a US airline's voting stock, while the limit is 31% in Canada and 49% in European Union. These restrictions limit the possibility of international expansion for even the most efficient and best-managed airlines such as SIA and Emirates, and lead to dependence on alliances to overcome these constraints.

In the past, many governments also intervened by subsidizing deficit airlines. The commission approved state aid to eight European airlines was reported to amount to an average of US$ 1.511 billion for the 1990-1997 periods. Such aid results in an uneven playing field and puts pressure on healthy airlines. Recently, governments have increasingly shown reluctance to shore up financially struggling airlines. In another instance, in the aftermath of the September 11th 2001 air attacks on the United States, when airlines worldwide suffered huge losses, no government in Latin America gave financial support to its national carrier (Donagis 2001).

Over the last two decades, the degree of government intervention in civil aviation has declined substantially. As a first sign, governments are becoming more open to divesting their stakes in airlines. Between 1985 and 2003, some 130 countries announced privatization plans or expressed their intention to privatize about 190 nationally own airlines. However, by the end of 2000, only 62 carriers had been privatized, 37 of them since 1995. Some governments, such as Malaysia and New Zealand, have gone in the opposite direction by buying back their national airlines after privatizing them (Taneja, 2003).

The trend of deregulation has spilled over into the control of routes. The United States pioneered deregulation of the airline industry in 1978, and its lead was followed by Europe starting in 1989 and implemented on a broader scale in 1997. Most Asian countries, with the notable exception of a few countries such as Singapore, are lagging behind in this respect. On a bilateral basis, many governments have signed open skies agreements which give complete freedom to their countries' carriers to choose their routes and frequency of flights to the signatory countries.

1.2 Managing the uncontrollable

Besides government intervention, the airline industry is also impacted by several factors beyond its control, including oil prices, airport and other charges, the quality of infrastructure, and political and other events which affect the financial health of the industry (see figure 1.3).

Oil, as one of the most important inputs for an airline, is a globally traded commodity whose price is determined by market demand and supply (see figure 1.4). Furthermore, oil price is denominated in US dollars, while many international airlines earn a substantial portion of their revenues in local currencies. Consequently, many international airlines bear a significant foreign exchange risk while some of the exchange risk can be hedged. Hedging is neither costless nor does it eliminate the risk completely. While fuel costs account for a smaller proportion of total costs today than 20 years ago, sharp upswings in oil prices, nevertheless, still impact the bottom line of airlines. United Airlines, for instance, incurred a US $75 million operating loss for April 2004 as a result of unusually high fuel prices, which constituted its second largest category of expenses behind labor.

Governments and airports impose charges such as landing and aircraft parking fees, which are sometimes quite different from prevailing market prices. Although oil is a globally traded commodity, there is significant variation in the price of jet fuel across the world due to local factors and policies. Airlines must take these fees and prices (which may be quite independent of true market prices) as ‘given’ without any possibility of negotiations.

Airlines are also affected by political and other events that might influence travel and tourism. The Gulf war in 1991 caused air traffic to decline for the first time in aviation history. By 1992, a combination of lower traffic, excess capacity and high oil prices led to huge losses in earnings for airlines that exceeded all the profits earned by the industry in its 67 years history (Ott and Neidl, 1995). In recent years, political and other events have assumed greater importance as a result of a series of far-reaching events including the September 11th terrorist attacks, the wars in Afghanistan and Iraq, and the outbreak of the severe acute respiratory syndrome (SARs). While the impact of the crises themselves is quite visible in terms of reduced demand for travel for the duration of the crisis, there are also second-order and less visible effects on the airline industry even after the event. For instance, after the September 11th hijackings, the added security procedures can raise airfares by as much as 20% (Taneja, 2003). Both factors have affected the demand for air travel, especially at the margin where air travel is discretionary. Leisure travelers may substitute air travel with alternatives such as cars, trains, and private jets.

1.3 Complexity

The complexity of managing airlines is increased by a number of factors on the demand side including the perishable nature of seats on a particular flight, the high level of seasonality and cyclicality, as well as the exceptionally long time horizon on important decision making such as aircraft acquisition.

Airline service is perishable and cannot be inventoried. Airlines' attempt to address the perish ability issue by using a variety of complex price discrimination strategies may at times result in destructive price competition while trying to fill seats.

Demand for air travel is cyclical as well as seasonal. Seasonality is easy to anticipate (e.g. peak travel during holiday periods) but difficult to address since catering to peak demand will lead to excess capacity during other times. On the other hand, unavailability of excess capacity will lead to lost revenues during the peak seasons. According to an industry expert, the industry can be considered as operating at full capacity at a utilization rate of 70%-75% (Taneja, 2003).

Cyclical demand poses even greater challenges to airline management team. During the trough of the business cycle, the high fixed costs adversely affect financial performance. The peak of the business cycle, on the other hand, often induces executives to overextend their company by ordering new planes, hiring more employees or promising generous pay packages to attract and retain employees, all of which might prove unsustainable in other stages of the cycle.

Airline management team also face the difficult task of planning for exceptionally long time horizons, especially relating to aircraft procurement. A large jet aircraft costs in excess of US$2,000 million, and its procurement typically involves significant lead time. Assumptions regarding the regulatory, economic or operating environments can easily go over such a long time and adversely affect the airline's performance. If an airline uses debt financing to purchase an aircraft, it is exposed to even greater risk in the event the environment turns unfavorable.

1.4 Performance

Despite the commercial aviation's prominent role in the world economy and a healthy growth over the last few decades, industry participants have faced significant challenges in attaining consistent levels of profitability.

Over the years, there have been a few bright spots in the industry's financial performance, mostly coinciding with a combination of such factors as significant technological advances, economic boom and low fuel prices. Unfortunately, for the airline industry's participants, prosperity has often been followed by severe adversity attributable to broader economic conditions and/or high fuel prices.

Falling passenger yields represent a key factor for the low industry profitability. Passenger yield, the equivalent of prices for the industry, fell at an annualized rate of 2.2% for the period 1985-1999 and 3% for 1990-1999. Freight yield fell at an annualized rate of 3.2% and 2.8% for the same periods. According to one estimate, the real yield fell from 12.5 US cents per revenue passenger-kilometers in 1970 to just over 6 cents in 2001 (Taneja, 2002).

Though profitability has proved to be an elusive goal, airlines worldwide have succeeded in providing high levels of safety to their passengers. In fact, the diligence of airlines and the effective oversight by governments have given the industry a far superior safety record compared with most other modes of transportation, especially cars. The odds of being killed on a single airline flight vary from 1 in 7.71 million to 1 in 558,000, for the top 25 airlines with the best safety records and the bottom 25 airlines with the worst safety records, respectively.

For an airline company to succeeded in the highly competitive global air transportation sector they need to consider the following factors: Improving accessibility through high frequency of flights and far-reaching networks, attaining high reliability in terms of completed flights, in the high 90% range, and flights arriving on time despite uncontrollable factors such as the weather as well as airport and air-traffic control capacities, providing affordable travel options through continuous improvement in technology and management systems, introducing innovations especially for passengers traveling in higher service classes.

1.5 Recent strategic trends

In response to US deregulation of its domestic airline markets, many countries, including the United Kingdom, New Zealand, Chile, Canada and Australia, have deregulated or substantially liberalized their domestic markets. The liberalization of the international airline industry, which commenced during the early 1980s, mirrors development of the trade liberalization. For example, open skies continental blocs closely follow a formation of trading blocs in North America and Europe. The USA and Canada signed an open skies agreement in February 1995. Australia and New Zealand have also formed a nearly open skies air transport bloc. As a result, international airlines are increasingly exposed to the pressures of the market place as deregulation and liberalization processes advance. Increased liberalization and continentalization have also induced major airlines to create global service networks through inter-carrier alliances.

Table 1.3 compares the destination airport in each region between 2007 and 2008, showing that the increasing number of airports by almost 90 stations, especially in North America. Table 1.4 shows that departure flights in 2008 increased up to 3,500 flights from 2007.

The increased competition and recent recession have led to severe widespread losses in the international airline industry, resulting in many airlines' major restructuring to improve productivity and reduce costs. Apart from an airline's proper strategies in the globalizing airline industry, the ability of a carrier to survive and prosper in increasingly competitive markets ultimately depends on its productivity and cost competitiveness.

Airline cost differentials are determined by differences in input prices and productive efficiency. Therefore, knowledge about existing levels and sources of cost differentials are essential for analyzing public policies and strategies designed to enhance airline competitive positions.

An alliance is generally a strategy that companies use when an acquiring or an internal development is not an option as means of growing. Sometimes, even if internal development is possible, the alliance may be preferable as it provides quicker access to new markets. The alliance can vary in degree of commitment from simple marketing cooperation to just short of complete mergers or acquisitions. Global mergers and acquisition deals between 1999 and 2000 in all industries exceeding US$200 billion indicated that companies increasingly embark on partnerships to achieve their expansion goals and to develop a world class capability.

In this respect, the airline industry is not an exception. There has clearly been a surge in forming of alliances among airlines in recent years. A large number of airlines have established or joined one of three global airline alliances: Star Alliance (established in 1997), Oneworld (1998), and Skyteam (2000). In 2002, those three alliances as allied partners control approximately 56% of world revenue passenger kilometers.

Table 1.5, 1.6 and 1.7 show an increasing trend in all four categories – passenger share, revenue share, passenger revenue kilometer and available seat kilometer – in 2006 to 2008. Star Alliance has the largest share in all categories, followed by Skyteam and Oneworld.

The majority of airlines are interested in expanding their networks beyond the markets they currently serve. However, due to regulatory restrictions on market access, ownership and control, they have been pushed towards the formation of strategic alliance groupings. Legislation aimed at protecting national interests has meant that it is impossible to acquire a controlling interest in airlines in countries or trading blocks outside those in which an airline is owned and operated. A natural growth is also subject to restrictions such as the limitations in growing in home markets, lack of regulatory approval to access foreign markets, or lack of slots at airports to which the airline wants to operate or expand. In addition to increasing their networks, airlines also aim at improving revenues, reducing costs and increasing customer benefits.

2. Objectives and research questions

This research has been carried out within the context of the changing air transport regime and strategies. In contrast to others point of view, the research on airline alliance development and the consequences for airline hierarchy and planning is still somewhat limited in scope. It is not clear to what extent airlines adopted strategic alliances into their strategic method, adopted hub and spoke network configurations and system of regulations, nor it is clear on how changing managerial strategic of airlines will effect the airline performance and/or passenger behavior. Neither has the issue of alliance been addressed systematically in academic studies. These issues are highly relevant from a scientific and societal perspective.

Hence, the objective of this study is to assess and describe to what extent airlines have reconfigured their alliance strategy, how these strategy changes have affected the airlines' performance, and how passengers can deal with the changing context of airline marketing strategic behavior.

For this reason, the aim of this study is broken into the following research questions: *Research question 1:* What have been the consequences of the reconfiguration of airline management team to change their strategy and move on to new strategy such as strategic alliance? *Research question 2*: To what extent have strategic alliances improved participating firms' productivity and profitability? *Research question 3*: How can strategic alliances deal with individual passengers and what is the pro and cons for passengers?

3. Design of the study

This thesis covers a broad range of issues. Each individual research question requires its own methodological and theoretical elaboration. In this thesis, the study is therefore structured in three parts, each of which deals with a specific research question (see figure below). Part 1 is based on the overview of airline alliances and prior research. Part 2 is based on effects of airline alliances toward airlines' management, or the supply side. Part 3 is based on effects of airline alliances on passengers, or the demand side. For the elaboration of the theoretical and methodological frameworks, a profit toward airlines is taken as the main focus. In addition, insights from regime theory, transport economics, and evolutionary economics are elaborated when necessary.

Part 1: Overview of airline alliances

<u>Chapter 2 Airline Alliance Consolidation's Effect on Companies' Productivity and Profitability</u>

Airline alliance is ‘three or more airlines participating in commercial relationship or joint venture, where: i) a joint and commonly identifiable product is marketed under a single commercial name or brand; ii) this commercial name or brand is promoted to the public through the airlines participating in the alliance and its agents, and; iii) the commercial name or brand is used to identify the alliance services at airports and other service delivery points in situations where bilateral agreements exist, for example code share agreements’.

Alliances began on a global scale in 1989, when the European Quality Alliance (Air France, SAS, and Swissair), the Global Excellence Alliance (Delta Airlines, Singapore Airlines, and Swissair) and the KLM/Northwest Airlines Alliance were formed. Alliances can be classified into two distinguished types – either complementary or parallel. The main distinguishing features are that complementary alliances have non-overlapping routes, whereas parallel alliance routes overlapped.

In addition, a very wide range of complex inter-airline agreements has grown up to meet specific airline needs over the years. Agreements were sometimes purely technical and might involve provision of engineering back-up by two airlines at each other’s home base or joint maintenance for specific aircraft types in their fleets. Many agreements involve the joint operation of cargo or passenger flights or the operation by one airline of such services on behalf of two or more partners. At the simplest level, it can be a little more than a prorate agreement which fixes the revenue that one airline will pay the other for carrying the latter’s ticketed passenger on a particular part of the former network. Or it may be more complex agreements for sharing codes on a particular flight or on several flights with or without block space agreements, whereby one partner will purchase an agreed number of seats from the other on the code-shared flights. Airlines may also jointly own computer reservation systems or have joint sales offices or telephone call centers.

To understand the complexity of inter-airline agreements, it is advisable to distinguish between those that are primarily commercial and those that are more strategic. In a strategic alliance, the partners co-mingle their assets in order to pursue a single or joint set of business objectives. Co-mingled assets may refer to terminal facilities, maintenance bases, aircraft, staff, traffic rights or capital resources. That is, if two or more airlines offer a common brand and a uniform service standard, they are co-mingling their assets and have moved into a strategic alliance.

Global Airline Alliance is the most significant alliances in terms of network expansion and is clearly those with a global scope. The prime purpose is to achieve all the marketing benefits of scope and the cost economies from any synergies through linking two or more large airlines operating on geographically distinct markets, ideally in different continents. Global alliances would normally involve code sharing on a very large number of routes, but ideally they aim to go much further. They may include schedule co-ordination, joint sales offices and ground handling, combined frequent flyer programs, joint maintenance activities and mutual equity stakes. The aim of a global alliance is effectively linking airlines in a different geographical area so as to provide world-wide network coverage and the benefits of large size and scope. Nowadays, there are 3 Global airline alliances, Oneworld, Skyteam and Star Alliance.

For this study, survey papers on regulations, priorresearch and comments in airline's industry along with alliance strategic point of view are studied. This is very important as it shows the overview and background of past research in this area, which include effects from both sides – airline and passenger, such as productivity, profitability, network decisions and cost structure.

Part 2: Airline alliances toward airlines' performance

Chapter 4: Effects of alliances on airlines' productivity and profitability

Since airlines have to find strategies to improve their performance with global expansion constrained by restrictive air services agreements. Alliance has brought benefits to airlines on various facets, such as cost saving, new market access, increase in load factors, yield improvement and shared operations.

Several research projects have studied the effects of alliances on different aspects such as cost reduction, market entry, market share and profitability. Porter and Fuller (1986) argued that alliances enable firms to achieve increased economies of scale through joint operations so that firms can increase profitability. Similarly, other research has found that alliances enable firms to be more efficient and gain larger market power, resulting in higher profitability gains. Oum et al. (2004) only examined the effect of horizontal alliances on firm performance in terms of productivity and profitability. Based on panel data from 22 airlines from 1986 to 1995, the study revealed that horizontal alliances have a significant contribution to productivity gains and have no significant or positive impact on profitability.

This section gathers panel data from 20 airlines and their alliance partners in terms of passenger-kilometers as published in the ICAO journal Annual Report including *Traffic, Fleet and personal and Financial Data* during the period of 1990-2004. Revenue can be divided into 5 categories: schedule passenger service, schedule freight service, mail, non-schedule service and incidental service. Cost can also be divided into 5 categories: labor expense, fuel, flight, ground property and other materials.

For the method of analysis, a panel regression model was employed to test out two hypotheses. The study reveals that parallel, complimentary and strategic alliances contribute significantly to productivity gains. Furthermore, all types of alliances (with the exception being complimentary alliances) left a positive impact on profitability. In addition, this study reveals that after September 11th, the productivity and profitability of airlines have shown signs of decline when compared to the performance of earlier periods.

Part 3: Airline alliances toward passengers

Chapter 5: Effects of alliances on travelers' perspective and their choice of air carrier in Thailand.

In this chapter, the impact of global alliances from the consumer perspective is observed. The benefits are stated by the alliance themselves – Star Alliance, OneWorld and Sky Team – on their website, press release and trade publications. The benefits will include greater network access, seamless travel, priority status, lounge access and frequent flyer program.

In comparing the potential benefits of an airline to alliances from travelers' perspective, the following points have been raised. Greater network access: Wider route networks can attract passengers due to travelers' preference on extensive networks. An airline can offer greater value to customers by extending its network of relationships with other airlines. An alliance airline can offer more itinerary choices than non-alliance airlines of a similar size. Seamless travel: Alliances provide passengers with seamless travel when transferring from one airline to another. For example, Star Alliance offers extensive code share flight options for its customers, manages quick transfers, and provides convenient check-in procedures. An additional benefit is the flexibility to change flight plans at short notice, especially for travelers flying on non-direct long-haul flights. Frequent Flyer Program (FFP) benefits: In the past, FFP benefits were not transferable between airlines. However, with the formation of global alliances, FFP points can be accrued and other benefits can be enjoyed with any airlines within an alliance. This means FFP members can earn priority status faster under only one program, and awards and royalty can be redeemed with any partner airlines in the same alliance. Priority and extended lounge access: As a way to retain airlines' most valued customers and maintain their customer experience, special treatments have been provided to customers in various forms of priority check-in, baggage handling, reservation waitlist, and airport standby. Global alliances also emphasize access to any alliance partner lounges as benefits for the travelers with 'priority' status, offering greater access to priority benefits from all partner airlines.

From prior research, Goh and Uncle, (2003) focused on the perception of Australian business travelers on benefits of airlines alliances. They found that a minority are unsure of the benefits and contain some misconceptions. The study shows no major difference between competing alliances as well as alliance benefits are not seen as important. On the contrary, this study is carried out in Thailand. Since the past research was studied in an Australian market, representing a developed countries market, hence this research can represent world travelers' perspective and choice on airline alliances for a developing country group.

In this study, cross sectional surveys of 573 Thai travelers at Bangkok international airport were collected. Survey timing was during December 20th 2007 to January 3rd 2008 and June 9th to 22nd 2008, comprising 18 working days, 8 weekends and 2 national holidays. The surveys took place at Bangkok international departure gates and lounges, to obtain premier class and top tier FFP travelers.

Chapter 6: Airlines' service of code sharing flight

It has been suggested that delivering superior service quality is a prerequisite for success and survival in today's competitive business environment. However, some may feel price is the most important aspect of the demand. For thisresearch, the emphasis is on improving service of code-share airlines' strategies. This research focuses on the gap between customer's expectation and perception of airline service quality, and on the demonstration of how an airline can utilize a measure of different passengers' gap as a diagnostic tool in managing its service quality, as well as educating passengers' knowledge.

The data for this study was obtained from after-flight mail surveys given out at Bangkok airport baggage claim areas from August 1st to 15th 2009, comprising 6 flights per day for Thai travelers on Narita-Bangkok route including passengers who took direct flights or bought code-share tickets regardless of airlines. Finally, 315 data sets could be used.

The study's methodology followed a "SERVQUAL" tool, which was developed by Gilbert, and Wong (2003), analyzing from both sides by the Likert scale 7 points. The Factor Analysis was utilized to group all the questions. Then the gap between expectations and perceptions was located. The analysis statistically focused on the differences of means between the expectation and perception scores for each factor.

Part two of this chapter involves SEM analysis to see the structural relationships of passenger's expectation and perception gap and overall satisfaction, fare and future purchase intention. This part is in the form of introduction, theoretical background, SEM analysis results, and ends with conclusion, including limitations and future research.

SEM model is suitable for this study since prior studies have suggested that the measurement of consumer satisfaction should be used in conjunction with the measurement of expectation and perception gap. At the same time, overall satisfaction and ticket fare satisfaction may be a better predicator of passenger's purchase intentions while the relationship between the above still remains unclear. The purpose of this section is mainly to examine the relationships between expectation and perception gap, overall service satisfaction, ticket fare satisfaction and behavioral intentions of passenger toward code sharing airline service.

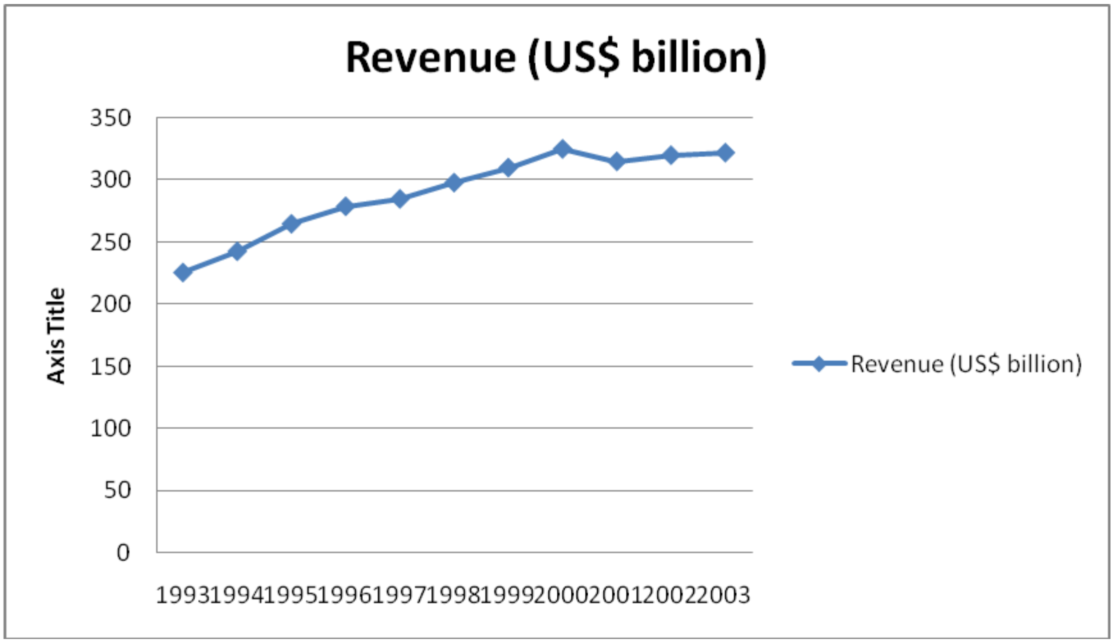
Chapter 7: Conclusion, implication, limitation and future research

The conclusion chapter ties the various findings of this study that alliances are a vital strategy for airlines to survive and prosper in today's competitiveness. Alliances allow airlines to gain in productivity and profitability by reducing costs, such as lounge sharing, airport facility sharing, and by introducing the economy of scale in purchases. Code sharing and block spacing within an alliance also leads to an increase in flight load factor and allow the use of more economical larger-size aircrafts. Alliances also increases customer benefits in many ways such as larger networking, enhanced frequent flyer program, upgrade, and premium services. This, in turn, attracts and retains customer base, as well as increase customer loyalty to the airlines or alliances.

Nevertheless, airlines and alliances need to promote these customer benefits to the passengers better than what is currently being marketed. A high rate of passengers still have misunderstanding or do not see the importance of these benefits. These passengers tend to select airlines mainly based on price rather than the alliance benefits. If airlines can build up a customer loyalty, they can charge a higher price and harvest a better profit. Additionally, passengers still rate the service very high. Airlines should strongly continue on enhancing their products and services, such as in-flight entertainment, food and drink, so passengers are attracted to the airline.

One disadvantage from alliances is that it reduces the market competition, in which each country government has to deal with. This, however, may not be totally true because airlines from same alliance still fly and compete on the same routes, without any code sharing.

Figure 1.1 Airlines' revenues from year 1993 to 2003



Sources: ICAO: 1996,2004

Table 1.1 Evolution of aircraft technology

Period	Most productive model	Year of production	Number of seats	Hourly productivity (tonne-km/hr)	Annual production capacity (thousand tonne-km)
1930s-40s	DC-3 piston	1936	21	527	1,571
1950s	Britannia 310 (turboprop)	1956	139	6,048	18,144
1960s	Boeing 720B	1960	149 Single class	11,256	33,770
	Boeing 747 (turbojet)	1969	550	31,935	95,805
1980s	Boeing 747-400	1989	568	44,350	133,050
2000s	Airbus A380	2005	882	52,500	Not Available

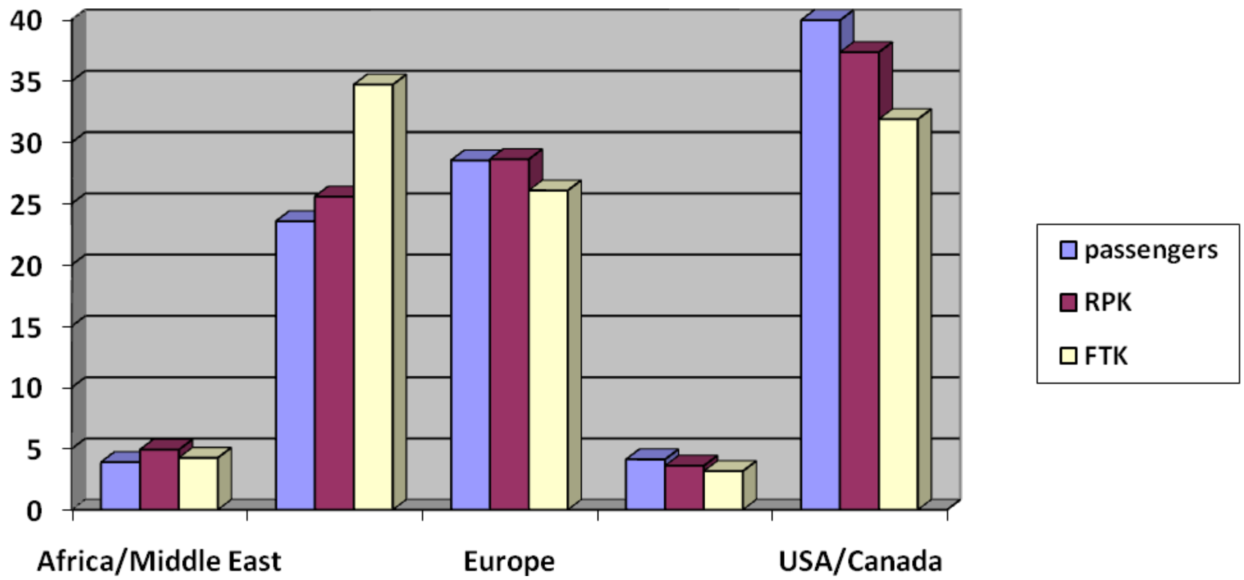
From Doganis (1991,2001)

There are a lot more several other aircraft models which is not mentioned in the table, such as Concorde, Boeing 777 and short-haul Airbus planes such as A300 and A320 which have lower levels of productivity than the most productive model.

Tonne-km/hr is arrived at by simply multiplyong the capacity of the plane (in tonnes) by the speed of travel (in kilometers per hour)

Figure 1.2 Passenger and freight traffic in different regions (2002)

(%)



FTK: freight tonne-kilometers

RPK: revenue passenger-kilometers

Souce: ICAO, 2004

Table 1.2 Regulation of air traffic

Freedom	Implication
First	The right of an airline of one country to fly over the territory of another country without landing.
Second	The right of an airline of one country to land in another country for non-traffic reasons, such as maintenance of refueling, while en-route to another country.
Third	The right of an airline of one country to carry traffic from its country of registry to another country.
Fourth	The right of an airline of one country to carry traffic from another country to its own country of registry.
Fifth	The right of an airline of one country to carry traffic between two countries outside of its own country of registry as long as the flight originates or terminates in its own country of registry.
Sixth	The right of an airline of one country to carry traffic between foreign countries via its own country of registry. This is a combination of the third and fourth freedoms.
Seventh	The right of an airline of one country to operate stand-alone services entirely outside the territory of its home country to carry traffic between two foreign countries.
Eight	The right of an airline of one country to carry traffic between two points within the territory of a foreign country.

From; Button et al. (1998), pg.31

Table 1.3 number of international airport services

Regions	Quarter 4/2007	Quarter 4/2008	Changes
North America	268	325	57
South America	64	63	-1
Europe	165	182	17
Asia	108	126	18
Middle East	18	18	0
Africa	15	16	1
Osiania	42	43	1

Source: International Air Transportation Association (IATA)

Table 1.4 Number of departure flights per day

Regions	Quarter 4/2007	Quarter 4/2008	Changes
North America	4963	8055	3092
South America	508	509	1
Europe	3340	3550	210
Asia	1395	1568	173
Middle East	36	37	1
Africa	19	19	0
Osiania	530	581	51

Source: International Air Transportation Association (IATA)

Table 1.5: Passenger share of each alliance in 2006-2008

Alliance Group	2006	2007	2008
Star Alliance	17.2%	22.0%	24.7%
Oneworld	12.2%	15.3%	15.3%
Skyteam	12.8%	14.0%	22.4%
Others	57.8%	48.7%	37.6%
Total	100.0%	100.0%	100.0%

Source: International Air Transportation Association (IATA)

Table 1.6 Revenue share of each alliance in 2006-2008

Alliance Group	2006	2007	2008
Star Alliance	20.0%	25.8%	28.40%
Oneworld	13.1%	16.3%	17.6%
Skyteam	10.5%	12.5%	22.4%
Others	56.4%	45.4%	31.6%
Total	100.0%	100.0%	100.0%

Source: International Air Transportation Association (IATA)

Table 1.7 Passenger revenue ton kilometer of each alliance in 2006-2008

Alliance Group	2006	2007	2008
Star Alliance	21.7%	23.9%	25.4%
Oneworld	16.0%	18.1%	18.3%
Skyteam	12.0%	12.7%	22.4%
Others	50.3%	45.3%	33.9%
Total	100.0%	100.0%	100.0%

Source: International Air Transportation Association (IATA)

Table 1.8 Available seat kilometer of each alliance in 2006-2008

Alliance Group	2006	2007	2008
Star Alliance	23.0%	23.4%	24.9%
Oneworld	17.0%	17.8%	17.9%
Skyteam	13.0%	12.5%	21.4%
Others	47.0%	46.3%	35.8%
Total	100.0%	100.0%	100.0%

Source: International Air Transportation Association (IATA)

Chapter 2

History, Regulations, Benefit and Diversity Of Airline Alliance

Introduction

Prior to learning about the impacts of alliances, we need to be acquainted with the background and also past research of alliances, the reasons for airlines to join as alliances, as well as the benefits to be achieved from alliances, both for the airlines and passengers. Therefore, this chapter will give an overview of all alliances, starting from the history of alliances, their emergence and evolution, as well as the need to join alliances in respond to regulations of each country that airlines have to confront. Subsequently, the benefits of alliances to airlines in economic perspectives, which include network expansion and cost reduction, will be presented, followed by the benefits of alliances to passengers in the forms of code share, frequent flyer points, etc. Finally, diversities of alliances will be introduced to enhance understanding on each type of alliances namely: horizontal and vertical alliance, and marketing, strategic and merger alliance. The last part of this chapter will cover major distinguished alliances and collaboration of global airlines.

1. History and motivation leading to the formation of airline alliances

Airline Alliance is a collaborative arrangement between two or more carriers involving joint operations with the declared intention of improving competitiveness and thereby enhancing overall performance. Despite a history of instability and failure, alliances are now prevalent among international airlines.

Such alliances began on a global scale in 1989. The European Quality Alliance (Air France, SAS, and Swissair), the Global Excellence Alliance (Delta Airlines, Singapore Airlines, and Swissair) and the KLM/Northwest Airlines Alliance were formed. Oster and Pickerell (1986) reported that, by 1985, nearly all of the 50 largest commuter carriers have formed code-sharing alliances with a major airline. These participating companies accounted for over 75% of the passengers carried by the commuter airline industry. As a result, other carriers had little choice but to follow because, as Dresner and Windle (1996) warned, “airlines that do not enter into alliances will find themselves at a competitive advantage unable to generate traffic from their alliance competitors”. They argued that since alliance grouping with member carriers from all parts of the world in the future would be few, competition would be between alliances rather than between the carriers. The failure to join a major global alliance would leave individual carriers isolated and at a competitive disadvantage (Button et al., 1998).

The propelling forces to form alliances have been the need to acquire global access, provide customers with global coverage and service the global markets. At the end, the winner is the alliance that can transport its passengers to the most destinations in the most ways (Airline Business, 2002).

The prime objective for any airline wishing to become a global player is to expand the geographic scope of its network without undertaking sizeable capital investment. A survey by the Association for Corporate Growth indicated that 67% of the sampled US and European airlines recorded global reach as a prime reason for forming alliances (Alamdari, 2001). The allied airlines, participating in another survey in 2004, agreed that the aim of an alliance was the creation of a global network serving many destinations without incurring extra cost for the airlines involved. In their own words, alliances ‘satisfy customer demand with more global demands’ and achieve ‘global presence without global cost structure’ (Iatrou, 2004).

Growth in the 1990s meant that airlines were expected to access new transatlantic and transpacific markets, thus they needed to start building a competitive international route structure. Even mega-carriers cannot achieve an access to all destinations solely on their own stream. Entering new markets would not only be too expensive, time consuming and risky to attempt with their own aircrafts, but would also be hampered by bilateral aviation agreements with other nations. Efficient global networks would then be necessary to overcome the afore-mentioned obstacles. By connecting their respective networks, alliance partners were able to expand their routes beyond their respective territories, access new markets and provide optimal customer services, all without any new financial investment. This linking of networks has produced an increase in traffic volumes and revenues as well as improved service levels via the introduction of ‘seamless’ travel initiatives.

Up to now, the result from forming alliances has been positive. However, several other benefit and competitive advantages may also be accrued from larger networks and better geographical spread. Apart from new traffic stimulation and cost saving, development of a joint network for airlines also results in generating strategic advantage, securing long term growth potential, and securing market-oriented cost efficient operations. Furthermore, the airlines’ needs for standardization, new systems to provide better service, cost and risk sharing, the creation of large entity necessary to enable airlines to strike better deals with their suppliers, and even knowledge enhancement, have all affect the airlines’ alliance decision. Some of the factors convincing airlines to form alliances are as follows:

- By successfully linking the members' networks, alliances secure additional traffic as each partner feeds traffic to the other and more passengers fill up the respective airplanes, thereby increasing load factor and revenues. By increasing the number of frequencies or destinations served, each partner is likely to attract more passengers to the network without actually increasing its own aircraft deployment. This effect is multiplied in terms of traffic volumes and market accesses, in such the same way as when an airline adds new destinations to its hub and spoke structure. The network expansion and the mutual traffic feed allow partners to make more efficient use of available capacity and achieve higher traffic density. This very simply results in the reduction in unit cost by increasing frequencies and possibility of using larger and more efficient aircrafts. In other words, economies of traffic density are achieved by securing more traffic per unit of capital. Consequently, it is reflected in the improved productivity of the fleet and other assets.
- Alliances allow partners to increase their efficiency, improving their use of capacity or reducing expenses by weeding out redundant operations and cutting back on fixed costs. By coordinating schedules and aircraft, partners can reduce their fleet requirements or take more effective advantage of the capacity available, as having a larger aircraft fleet makes it easier to match the aircraft size with the demand of each specific route. Shared or consolidated use of airport facilities and ground handling arrangements and staff (alliance partners often use the same ground handlers at each of the alliance's hub), cooperative advertising and promotional campaigns, joint procurement of fuel and amenities, combined development of computer systems and software, and mutual handling of baggage transfers and passenger check in processes are some of the ways alliance help foster economies of scale.

- Alliances enable carriers to enhance the marketability and quality of their services to passengers by offering more convenient flight schedules, greater flight frequency, a larger network and more online connections. Partners in an alliance coordinate flight schedules to minimize waiting time for connecting passengers and ease connections by locating arrival and departure gates close to each other, resulting in a ‘seamless travel’. All these features improve the quality of the services available to customers and may increase customer loyalty, just as Frequent Flyer Programs (FFPs) gains customers’ appreciation when passengers are provided with a wider range of choices. In addition, the alliance structure facilitates common alliance ‘branding’ on a global scale.
- Alliances help airlines to overcome regulatory constraints which hinder the ability of individual airlines to enter and expand in foreign markets, for example, capacity restrictions in air service agreements, restrictions on ownership and equity holding across national borders, and restricted access to airport infrastructure. Many analysts see this as perhaps the most critical factor pushing airlines to cultivate alliance strategies. Cross-border liberalization has played a pivotal role in the way alliances have been developed.
- Alliances have permitted airlines to enhance their ability to exercise market power and reduce the level of competition. Airlines which previously competed on a route can decide to cooperate and thus acquire competitive advantages over their incumbent or prospective challengers. Traffic feed increases each airline’s dominance at its respective hubs, creating network effects that raise entry barriers. These entry barriers include the lack of access to scarce slots in congested airports and demand-side economies of density and scope, as airlines rarely enter a new route unless they can rely upon a meaningful presence at their hubs at the same time. The coordinated

contracting allows airlines the potential of increased negotiating power and better deals with fuel and service providers, for example ground handlers, travel agents, corporate accounts, etc., again offering another way to put pressure on competitors.

- Alliances present a way to temper the uncertainty of the operating environment, especially for smaller airlines. They have provided these airlines with a safe harbor and have helped them to deal more effectively with their major competitors in most areas of business activities.
- The flexible structure of alliances has allowed each partner to monitor its growth within the grouping, meanwhile retaining the capacity to make adjustments to its contribution or level of commitment and even to leave the alliance as a result of changes in the strategic environment.
- Alliances are built around large airlines from the major air transportation markets, which are under greater pressure from the effects of globalization and deregulation. The alliances of the large airlines are joined by smaller companies that provide regional services acting as feeders for the large hubs, and transport passengers from the hubs to the smaller peripheral regions.

2. Regulation

In an effort to answer the demands of a global environment competition, most firms in other sectors than airlines have had the 'luxury' of being able to choose at will between mergers/consolidations or even external growth and alliances. On the other hand, airlines seeking to extend their networks have had to deal with a rigid regulatory framework that dissuades similar freedom of movement. The nationality provisions of this regulatory framework, which prevent the taking over of a foreign airline and prohibit the operation of domestic services in a foreign market, have forced airlines to resort to global alliances as a fall-back practice of integrating markets and achieving growth. This means that alliances cannot be fully understood unless the wider political and regulatory context they spring from is taken into account.

Alliance evolution has been influenced by, and has had an impact on, the course of deregulation in many domestic markets and regional blocs. It has contributed and has felt the effects towards the gradual liberalization and relaxation of the international air transport industry. Together, inter-governmental agreements and inter-firm strategies have created a new environment that is offering new opportunities and challenges.

2.1 The Chicago regime and ASAs

Since 1944, the air transport industry has been governed by the Chicago Convention rules. That is, only those airlines designated in the bilateral agreements (Air Service Agreements - ASAs) between two countries have been granted transport licenses and traffic rights on specific routes at specific frequencies and capacities. To be designated, an airline has to be 'substantially owned and effectively controlled by nationals' of each of the countries concerned. This nationality clause is further reinforced by the limits set by each country on foreign investments in their airlines. Any attempt to merge or consolidate would mean that such rights would be lost of have to be renegotiated.

The most fundamental matter of the rules regulates whether or not a country authorizes other countries' aircrafts in their airspace, when and where such aircrafts are allowed to land, and between which points they may carry revenue traffic. The routes that can be flown are listed in a route schedule, which in some cases lists the specific pairs that may be operated and in others simply provides that airlines may operate to any points in the state territory, from or to any foreign points. There are restrictions on the number of airlines from each side that may operate the routes. Up until the 1970s, most agreements only allowed one airline from each side to operate each route (single designation). Some bilateral agreements allow routes to be flown by two carriers from each side (double designation), while liberal agreements permit operations by an unlimited number of carriers (multiple designation). A 1982 report indicated that two-thirds of European bilateral agreements had no limitations on the number of airlines designated, with one-third restricted to single designation. In practice, however, only 8% of total country-pairs and only 2% of city-pairs operated had more than one designated airline from each state.

The so-called Chicago regime led to the almost universal protection of national flag carriers. For many years, the bilateral ASAs allowed comfortable duopolies between the respective state airlines of contracting states, even allowing the pooling of revenues on shared routes.

But the worldwide and cross-industry tide of globalization was to influence the air transport industry too. The most important developments to help ease the restrictive nature of the industry were deregulation in the US and liberalization in Europe.

2.2 Regional and multilateral liberalization

The deregulation process in Europe started in 1986, proceeding gradually in three stages. By 1992 the European Union countries enjoyed a Common Aviation Market in which bilateral agreements had been superseded by multilateral arrangements. Europe is currently the world's first fully deregulated region, or single market, consisting of 15 member states, plus the three states belonging to the European Economic Area (EEA), Norway, Iceland and Liechtenstein. It also consists of Switzerland, in addition to, since May 2004, the 10 new members of the European Union. European liberalization ensured open and unrestricted market access to any routes within the European Union for airlines from any Member States, and removed all capacity and price controls. Ownership constraints were relaxed so that airlines with unlimited access rights could be owned by national or companies from any of the Member States. Parallel to this, the European Commission took measures to ensure that 'competition rules' applying to other industries would also apply to airlines.

But the European single market did not bring about a complete 'denationalization' of European airlines, much less the complete withdrawal of governments from the regulation of air transport. The nationality clause was replaced by 'Community ownership', so that in order to qualify as a 'Community carrier' an airline had to be "owned and continue to be owned directly or through a majority ownership by Member States and/or nationals of Member States.

Deregulation in Europe was accompanied by partial privatization of most of the (almost exclusively) state-owned European airlines. The deregulation process was implemented as not to seriously hamper the competitive advantages of the flag airlines. Despite privatization, airlines remained national and it was (and apparently still is – with a few exceptions) unacceptable for any government to let its flag airline fail. As a result, traditional flag airlines secured or even extended their presence at their traditional hub airports, which proved an invaluable asset when the time came to form alliances.

Deregulation applies only to air transport within the European Community and the EEA countries, while air transport services between EU member States and third countries have continued to be regulated by traditional ASAs.

Apart from the European Union, there have been other efforts towards regional and multilateral liberalization, such as the Multilateral Agreement on the Liberalization of International Air Transportation in which the USA and four of its aviation partners, Brunei, Chile, New Zealand and Singapore (all of them are members of the Asia-Pacific Economic Cooperation organization or APEC) reached a multilateral open skies agreement.

There were also other agreements that seek to liberalize air transport services by providing greater market access and improving services implemented by member states according to regional or sub-regional criteria. Small groups of states of comparable size and development found it easier to agree on market access than larger, diverse groups of states, as well as constituting a more manageable environment within which to test liberalized air transport policies.

2.3 The impact of liberalization on alliances; alliance development and the liberalization trend toward open skies

International aviation policies and corporate strategies are affecting each other in such ways that result in serious implications for the structures of international aviation. This symbiotic relationship becomes even more obvious when observing how liberalization has moved hand-in-hand with airline alliances. A distinctive feature of the current mega-alliances is that one major US airline and one major European airline form the core partnership. This paring is by no means a coincidence, but instead answers the specific needs of airlines and their corporate strategies. In 2004, passengers carried on transatlantic flights represented 3.7% of all passengers transported by air worldwide, mainly because transatlantic flights connected the world's two largest domestic air transport markets which account for 23.3% and 29.2% respectively of global air traffic (IATA, 2005). It is therefore understandable that the authorities and the airlines from these areas have led and shaped international liberalization.

In order to better understand the origin and background of European Union and US airline strategies, which results in alliance formation, it is important to remember the peculiarities of the two markets. European airlines have always given priority to intercontinental business over domestic operations. US air transport, on the other hand, originated as domestic industry with a separate and specialized international sector. This can be explained as an accident of geography; the greater distances to be travelled within the US have favored the development of a strong domestic airline industry, whereas in many European countries there is little market for domestic aviation because of short distances.

By 1992, major European and US airlines were essentially facing the same dilemmas: both had very large stakes in North Atlantic routes, both were hit by the slump in traffic caused by the Gulf War and both were anxious to draw more directly on traffic within the other's home markets.

European airlines started looking at the US market, which, in terms of traffic, was even higher than that created through the emerging European single market. This US market was becoming increasingly rationalized into a hub-and-spoke system, with some hubs often located well away from the traditional East and West coast points of entry for international traffic. The dilemma of EU airlines was that even assuming they could obtain international authority to fly to the hubs concerned, under US law they could not organize their own hub-and-spoke systems within the US.

Although US airlines could expand their shares of international traffic with the consent of liberal foreign governments and thus draw traffic from other European hubs, sabotage rules prevented them from setting up their feeder networks within Europe. Nor could they buy into national airlines, given the restricted foreign ownership rules, and even if it had been possible, it would probably have turned out to be prohibitively expensive. What they needed was to control feed from European markets on to their transatlantic flights at levels and through hubs comparable to those available from their US networks.

The Single European Aviation Market further hindered the attempts of US airlines to create hub and spoke systems within Europe, as its establishment results in the loss of some of their fifth freedom rights. For example, a US airline could no longer fly from Rome to Paris once the European aviation market was considered to be unified, because such a flight required sabotage rights the American lacked. US airlines were therefore forced to enter into alliances with European airlines operating in these markets, to preserve such flights through code sharing. Before the change, various foreign airlines, including several from the US, had obtained fifth freedom rights to carry traffic between national capitals as an extension of transatlantic services. In single market logic, services of this kind, which had previously been defined as ‘international’ flights became ‘domestic’ instead, were prohibited under the sabotage clause.

The best solution for both US and European airlines was to establish alliances, which represented the mechanism that could provide indirect access to restricted markets. In addition, US official policy was of considerable help in devising the successful corporate strategies that would allow the American carriers to conclude these alliances.

In the wake of deregulation, with a more competitive environment, the airline industry became increasingly concentrated. Parallel to the consolidation trend affecting full service carriers, new low-cost and value-based airlines were starting to emerge. The development of hub-and-spoke networks, the improvements in technology, the growth of frequent flyer schemes, and the role of computer reservation systems all contributed to the proliferation of alliances.

Although they were now liberalized, the US and EU airlines were looking for ways to obtain government support in either securing their position in the domestic markets or gaining access to new markets through alliances and ‘open skies’ agreements. Once this support was obtained, the appropriate national or regional authorities would then allow the go-ahead to the alliance efforts. Their approval almost always related to the granting of concessions.

Liberalization has been the great catalyst behind the formation of airline alliances. Without liberalization, it would have been impossible for airlines to cooperate closely enough to find the common ground enabling them to reap mutual benefits. Full deregulation in the European Union, in combination with open skies agreements, have enabled airlines to access new markets, a process that could never have occurred within the confines of the Chicago bilateral regime.

For open skies regulation begins as the new US majors started out on a path of vigorous international expansion, they came up against the restricted international bilateral system of traffic rights – a stumbling-block which made it difficult for them to operate outside their national markets. Only liberal ASAs providing for full market access without restrictions on designation, route rights, capacity, frequencies, code-sharing and tariffs between the participating countries could enable the large US players to become more actively involved in the international scene by flying to new markets. The US government therefore started pressing for less restrictive ASAs – known as 'open skies' – which would provide access to all routes between two given countries, by removing the restrictions and designation, capacity, fares and frequency, meanwhile maintaining ownership rule limitations. Even these 'open skies' agreements, however, required the airlines designated by each of the states in the bilateral agreement to be 'substantially owned' and 'effectively controlled' by nationals of the designating state.

As a result, the US began to renegotiate bilateral ASAs. In 1984, the Netherlands and the UK deregulated the air transportation services between their two countries by adopting an 'open market' bilateral agreement, the first step towards the gradual liberalization of international air transport. From 1992 onwards, the USA began to sign a series of open skies bilateral air services agreements and by September 2006 some 73 bilateral open skies agreements had been concluded (US DOT, 2006).

Nonetheless, critics of open skies agreements tend to brush them off as being merely a liberalized form of Chicago regime bilateral agreement, given that they still restrict competition on routes between the signatory states to airlines ‘substantially owned and effectively controlled’ by nationals of those states and forbid services by foreign airlines within domestic markets (European Commission, 1997).

Even with complete deregulation, European Union airlines are operating under a regulatory regime divided into two parts - one governing flights within the European Aviation Area, the other governing international aviation outside the European Union, where rigorous tests of nationality are still applied. Current negotiations between the EU and the USA regarding the so-called Trans-Atlantic Common Aviation Area (TCAA) will signal the starting point for more radical changes in the industry, further liberalizing the two biggest air transport markets of the world and making the consolidation of the sector through mergers, acquisitions or takeovers possible, at least at intra-continental level.

2.4 Current regulatory framework on airline alliances and international coordination of regulations

International air services between most countries are far from being fully liberalized. Bilateral agreements continue to restrict competition on aspects such as the number of possible flights, the number and identity of the carriers and airports that can be served. Even the bilateral “open skies” agreements initiated by the US include provisions that limit competition. International airline alliance agreements must comply with the applicable regulations in the partner airlines’ home countries. For example, alliances between airlines operating across the Atlantic are subject to the competition laws of both the European Commission and the US. The difficulty is that two or more competition authorities could reach conflicting or incoherent decisions.

Code sharing agreements between partners is a key feature of international airline alliances, whereby one airline's designator code is shown on flights operated by its partner airline. The US Department of Transportation (DOT) has taken the position that code sharing agreements between US and foreign airlines require approval by DOT. Although DOT has the final authority to approve, or disapprove, a code sharing agreements, the US Department of Justice (DOJ) reviews code sharing proposals for potential antitrust violations.[1] Even though international airline alliances cannot, by law, lead to a merger, DOJ approaches code sharing agreements and associated alliances from the same perspective as a merger.[2] If it determines that a proposed alliance would cause anti-competitive effects, it may impose conditions on it or prohibit it altogether. Unique to the airline sector, DOT has the right to challenge any approval by DOJ, and it also has the power to grant antitrust immunity in international aviation agreements.

While the US authorities have been consistently active in applying competition law to alliances between US and EU airlines for some time, the European Commission (EC) had been relatively inactive in this aspect prior to the proposal of the British Airways/American Airlines alliance. British Airways (BA) and American Airlines

[1] DOJ took over responsibility for approving airline mergers and alliances from DOT in 1989.

[2] DOJ uses the principles contained in the 1992 Horizontal Merger Guidelines in analyzing such alliances.

(AA) first announced their proposed alliance in June 1996, which would give the pair 64% of all seats between London Heathrow and the US, and a monopoly on a number of vital routes. This set off alarms prompted the EC to begin reviewing antitrust implications of proposed alliances, reviving its interests in airline alliances. Officials realized that they could not just restrict AA and BA without examining other alliances. The fear was that, far from benefiting consumers through efficiencies, such alliances would gain undue influence over the market. This is in contrast to a somewhat more favorable stance towards such alliances by the US DOT.

The EU also feared that the US has used alliances and antitrust immunity to sign open-skies agreements with its member states, which provides advantages to US airlines over EU airlines. The US bilateral open-skies agreements with the Netherlands, Austria and Belgium were signed concurrently with the US granting antitrust immunity to KLM/Northwest. It is perceived that an open-skies agreement has become a pre-requisite for the US to grant antitrust immunity to proposed alliances between US airlines and foreign airlines. BA and America, with limited code-sharing operations, are seeking antitrust immunity, but their request would not be granted until the US and UK can reach an open-skies pact.

The growth in international airline alliances has created a significant increase in the number of code sharing services being offered. Naturally, there is a corresponding increase in the number and importance of code sharing provisions in bilateral air agreements. In fact, code share has become an integral part of the bilateral process as is the formation of airline alliance.

National competition policies play an important role in the international aviation market. For many countries, international operations represent a vital source of their total aviation revenues. Domestic mergers are often justified by the argument that they would help improve domestic firms’ international competitiveness as international aviation is gradually being liberalized. The importance of this argument rests on the importance of economies of scale and oligopoly market structure (hence, imperfect competition). Clougherty(1996) analyzed empirically the influence of a merger of domestic airlines on the international airline market. Using cased from North American airline mergers, he found that the increase of market concentration in the domestic market did contribute to an increase in domestic firms’ market share in the international market.

When there is an asymmetry in merger/competition policy across countries, caution should be taken in liberalizing air transport markets. Suppose that the foreign country does not have a strong competition policy (or does not enforce it rigorously) while the home country does. Then an unconditional liberalization by the home country may lead to a situation where domestic firms are driven out of market. This is because the merged foreign firm is able to extend its reach to the domestic market and realize economies of scope and density, thereby driving its unit cost down. At the same time, the home firms may be unable to merge and thereby have to be confined within the home market. As home firms exit from the market, merged foreign firms would become the dominant firms, putting an upward pressure on prices. As a result, unilateral liberalization may not even achieve its original intention of promoting competition in the home market; it may hurt home firms if left alone. Therefore, there is a need to coordinate/harmonize competition polices among the regulatory/harmonize competition policies among the regulatory agencies of the countries involved. The establishment of such coordinated regulatory structures and the liberalization of international aviation would reinforce each other and should be pursued simultaneously.

As the world airline industry is undergoing changes through consolidation at both national and international levels, it is important that the restructuring be guided by an appropriate regulatory structure. The desirable international regulatory structures on strategic alliance should have some of the following features. First, national competition policies and enforcement practices for all industries should be in place and transparent. Further, they should converge to an adequate, common standard across countries. Second, as the pace of deregulation and liberalization continues in many countries, airline alliances and their competitive effects should be treated within the general framework of competition policy. Third, where relevant, international coordination of national regulatory agencies should be directed towards alliances-related matters such as slot control at each country's hub airports, disclosure of the operating carriers of code shared flights on computer reservation system displays, and antitrust immunity granted by each country. An interesting question here is whether a super national competition policy and a super national regulatory body may be more effective in dealing with some of these matters than mere international coordination. While recognizing the potential benefits, we note that there is no precedent in other industries for such super national competition policies and associated regulatory bodies.[3]

[3] It is particularly surprise to observe that there are no super national competition agencies in those industries that enjoy much more commercial freedom that aviation, such as telecommunications, automobile manufacturing, computer hardware, and computer software industries despite the fact that they are covered by GATT or GATS.

3 Alliance benefit through economics view point

Airlines, like all firms, form alliances because they expect to accumulate financial rewards in the form of increased revenue, profit maximization and cost reduction. The value of any alliance lies in its ability to produce such benefits- either by increasing dominance in existing markets or opening up access to new ones. Recent research (Iatrou and Alamdari, 2005) has shown that airline alliances have performed well at revenue enhancement level and lived up to airlines’ expectations, whereas cost reduction efforts have been rather limited, with correspondingly poor results. Baker and Field, 2003 and Iatrou and Alamdari, 2005, said that Cost-saving rather than revenue gains have emerged as the priority for global alliances as they come to terms with economic crisis and an uncertain future. According to the principles of rudimentary economics, in network industries, the sheer size of the allied airlines will bring about economies of scale. This, together of scale and scope, along with the way the respective networks are combined to increase traffic and facilitate connections, will in turn produce economies of traffic density. Clearly, to examine these parameters in isolation is misleading since they are closely interrelated. Any increase in one or all of them will lead to an increase in revenue and profit. However, in attempt to bring clarity and a brief summary, they will be examined separately here.

In certain respects, air transport is no different from any other business, as its objectives are to make profits and to provide a service at a price passengers are willing to pay. However, some distinctions and peculiarities exist because airlines operate in a cyclical and seasonal environment, participate in capital and labor-intensive operations requiring information-intensive processes, have to deal with constantly rising fuel costs, and are extremely vulnerable more than other industries to external factors beyond their control, such as economic crises, terrorism and wars.

The airline industry is a service industry and as such will always be labor intensive with limited changes of lessening labor requirements, because markets and locations are geographically dispersed. At the same time, the business also requires substantial initial capital. Although the most important capital input for airline facilities, aircraft, slots and gates can be leased without incurring such costs, new entry has to invest in the promotion and marketing of any new service, the costs of which cannot be recovered in the event of a subsequent exit. These costs can be significant, particularly for an entrant that must spread them over a small passenger base. Another risk factor in the industry is its dependence on fuel. As new aircraft become more fuel-efficient, fuel costs are coming to represent a smaller part of overall operating costs. In spite of this, fuel still remains a significant item, accounting for an average 10-15% of total operating costs, and is probably the most difficult expense for airline management to forecast. Any increase in fuel prices affects fare levels, taxes and dues.

3.1 Benefits of size

Economies of scale are achieved as a function of size is reflected in a firm's long-term average costs as the size of its operations increases. They evolve mostly from the spreading of fixed costs over an increasing volume of output. Economies of scale occur in the air transport industry if a carrier can serve the same amount of traffic at a lower cost.

Economies of scale can be generated from returns to scale, learning, specialization and the distribution of fixed costs over a larger output (Gsell,2005). Categorizations of economies of scale in the past have included 'technological economies' (based on large scale production and large parts), 'managerial economies' (improved division of labor) and 'financial economies' (reductions in units costs when purchased, sales and financial transactions are made on a large scale) (Kleyman and Seristo, 2004).

In the case of airline alliances, returns to scale or technological economies can be achieved by the efficiency gains of larger aircraft. Larger planes tend to be more efficient on unit cost basis than smaller planes. For an airline facing insufficient demand in a particular market, having to fill a large plane implies a distinct cost disadvantage. Given the need airlines have to maintain mixed fleets in order to meet the different demands of their networks, technological economies through airline cooperation can be obtained to a very limited extent on specific city-pair routes. Financial economies spring from higher bargaining power in purchasing aircraft, spare parts, fuel, maintenance, catering or other services. Specialization` in relation to the learning and sharing of best work practices, known as managerial economics, can lead to lower process costs and automation. Greater negotiating clout with external suppliers can also be obtained. Joint procurement among alliance partners has so far provided marginal savings on certain items of the airlines' operating costs, with office stationery, a few minor non-branded commodities and fuel being the most strategic of these.

Finally, fixed costs such as sales offices, airport ground handling and maintenance facilities, reservation and ticketing counters or headquarter functions can be spread over a larger output to increase utilization levels. By eliminating the doubling-up of operations, such costs can be shared by an alliance's allied members, thus reducing the overall cost for all partners.

3.2 Joint procurement

The power and size of an alliance enables it to negotiate from a position of force and strike better deals with suppliers on aspects ranging from aircraft manufacturing to in flight amenity. The ability of partners to take advantage of increased volume and higher bargaining power in purchase of resources brings opportunities for cost reduction and cost efficiency. An example of such a supplier-airline contract is the agreement of SkyTeam and Coca-Cola (2002), both company agreed to 8 years strategic marketing and beverage agreement from which SkyTeam basically obtaining value marketing funds in exchange for beverage exclusivity on all alliance flights.

Doganis 2001 shows that Star Alliance members purchase approximately US$15 billion of goods and services each year. By buying in bulk they have achieved a better price per aircraft than if each had ordered separately. However, allied partners have been unable to exploit the full potential of joint procurement. Star Alliance set itself a goal of US$150 million in annual savings through joint procurement, but this amount represents just 0.1% of expenses for the whole alliance. (O'Toole and Gill, 2000). O'Toole and Gill study carried out in 2000 by Gemini Consulting in conjunction with Airline Business estimated that alliance members who were prepared to pool their management of 'external services' –which include ground handling, maintenance, catering charges and fees- could cut some 3.6% of their overall expenses, compared with 1% at simple coordination level.

3.3 Labor cost reduction

Labor represents one of the biggest costs for an airline. Among major North American Airlines, labor costs including social charges generally account for 30-40% of total operating costs, where as the figure among European airlines is somewhat lower at 25-35% (Doganis, 2002). The cost of labor acts as a major cost differentiator between airlines competing in the same markets, since other input costs (fuel, landing fees, aircraft purchase and ground handling) will be roughly the same (Doganis, 2001). An alliance gives the participating airlines the chance to reduce their labor costs in two ways. Firstly, airlines are enabled to reduce the number of sales and ground personnel by sharing the offices and the bases of their allies instead of maintaining separate offices in many parts of the world, and secondly, they are also enabled to resort to the low wage structure of their allies to staff operations.

Once alliances have achieved the necessary critical mass, outsourcing represents a way to subcontract a particular activity to a third supplier and avoid having to maintain staff to carry out the activity in question.

A further factor affecting labor productivity is the degree of outsourcing which an airline undertakes. If labor-intensive activities such as flight kitchens, heavy maintenance, aircraft cleaning or IT support are outsources, then an alliance's own staff members are invariably reduced and output per employee is enhanced (Doganis, 2001)

3.4 Benefits of network size

Important parameter of airline cooperation remains to be considered in relation to economies of scale: change in the network structure of the allied or merged partners, whether in terms of the increased size of the combined network or that of the network configuration of the allied partners.

In air transport industry, economies of network size, or the benefits from the combination of the cooperating partners' networks, coincide with the economies of scope of traditional economics. A firm is said to enjoy economies of scope when it is able to reduce its average cost of production as new products or services are added to its range. In air transport, economies of network size are achieved in relation to the number of points served by an airline. They are generated as a result of traveler demand for service in more than one city-pair, in other word, economies of scope derive from the traffic aggregation potential of a hub. Therefore, airlines hope to tap into such economies by extending their marketable network, through various forms of alliance cooperation that can result in greater market power on certain routes. If a firm size is defined by the number of points served, economies of scale and scope merge, since increasing scale is affected by adding new markets, new city-pairs. Thus, firm size translated into network spread transforms the optimal route structure from point to pint network to a hub and spoke network.

The bigger the hub and spoke network, the cheaper it becomes to add additional city pairs to it. Besides reducing the average cost of trips on offer to multiple destinations, network economies also bring convenience to consumers by allowing one-stop travel to a variety of destinations.

The airline industry may exhibit economies of scope both in terms of cost, where the cost of producing a range of products in combination is less than producing any subset of them, and of demand, where the demand for a range of products is larger than if the products were produced individually. It is through marketing tools that airlines secure the demand-side economies of scope.

3.5 Marketing advantage

The economies large airlines manage to accomplish in terms of scope are mainly linked to marketing and generally concern network size. (Size and scope come into play in alliance marketing.) With no added investment in terms of the number of points they actually serve themselves, airlines manage to have economies of network size through alliances. Sources of these economies are code-share agreements, market presence through joint branding, and access to frequent flyer programs. Alliances permit carriers to enter new markets through code sharing and joint marketing with their partners in those markets. Because alliances serve large and widespread networks, they can more easily afford large scale marketing campaigns, which are much more efficient than promotions of individual routes.

Within this framework, individual airlines are guaranteed a global advertising campaign and the opportunities to advertise in unison with the alliance to which they belong. Their name appears under that of the alliance, even in relation to countries and areas they do not serve.

Economies of scope confer competitive advantages to the partners in relation to passengers and travel agents. As members of an alliance, they offer a more comprehensive- indeed, a global-travel product, which enables them to attract premium class passengers, corporate accounts and large agency business contracts, as well as international leisure passengers. An alliance serving the largest network from the travel agent's home city provides the agent with the most opportunities to sell tickets, thereby reinforcing the advantages of size and scope.

3.6 Branding

Airline tends to wage competition in the non-price arena, using advertising and increased customer services as their major weapons. Once travelers obtain information about service, quality, cost and convenience, they form an impression about that airline's service in other markets. This is where the concept of branding comes in.

Through product and service improvements, combined with targeted promotions, an airline can go from being a common service provider to becoming a ‘brand’.

Airline brand is exemplified not only by service and product standards but also by the designs and colors used in the aircraft interior and exterior and on the ground, as well as for more mundane items such as cutlery, ticket covers, and so on. The same applies to the alliance brand. The need to promote both the airline and the alliance poses a particular branding and image problem since they are less likely to all have the same high service standards and an equally good image.

According to Kleymann and Seristo, 2004, the most visible scope benefit for individual carriers arising from branding on a global scale is value enhancement in the form of the ‘reputation effect’. In other words, alliance membership is frequently seen as a sign of approval or a quality seal.

An alliance leaves national carriers with their own branding and management, while at the same time pursuing promotion of the alliance brand to a limited extent only. Each alliance has addressed the branding issue differently. In Star Alliance, the alliance brand is much more dominant at check-in counters across the network. . In contrast, Oneworld has taken a different approach.

3.7 Reduced cost of entering new markets

Economies of scope also occur in alliances when it is less expensive to increase service on the existing network than it would be for other airlines to initiate new service on the same routes. Alliance members can capitalize on economies of network size without expanding the number of points they serve themselves. This is mostly affected through code sharing. Instead of investing large amounts of money in order to enter new markets, an alliance can sign on the airline that nominates a specific local market and hub and incorporate it into its network. The alliance can then provide efficient connecting service to new origin-destination markets, without having to incur capital investment, landing fees, advertising, or price wars.

3.8 Benefits of network configuration

Economics of density arise in network industries when a firm's average cost decreases as more customers use its network. In the airline industry, economies of density are achieved when the number of passengers on a particular route increases and the average cost per passenger declines on that route. By combining passengers and groups of passengers an airline can carry the total more cheaply than if it carries them separately. Greater density enables the airline to use larger, more efficient aircraft with lower costs per seat-kilometer, that is, per unit production costs, or operate at higher frequencies and consequently at higher load factor, which leads to lower costs per passenger-kilometer. The larger aircraft consumes relatively the same amount of scarce resources, such as slots and gates and maintenance resources, as smaller aircraft. In other words, economies of traffic density enable airlines to make more efficient use of maintenance and ground support personal, airplanes and gate space.

Economies of traffic density are directly related to economies of scope, and the mechanism that enables airlines to access these economies is hub: network configuration in a hub-and-spoke network pattern. Hub, the way the allied or merged partners organize their combined networks so as to achieve the maximum benefits in terms of traffic, load factor, geographic spread and market share increases density by enabling the airline to consolidate traffic from many different origin destination markets onto smaller number of links in the network. It is also directly related to hub-dominance, airport slot constraints and fleet rationalization, which in combination with marketing mechanisms- FFP- may create barriers to entry for new competitors.

Alliances enable each airline to extend its marketable network to cities served by its partners and in this way attract more traffic, without extra investment. Thus, each member's marginal cost may fall through economies of traffic density. Without traffic density, network expansion would involve added expense- more aircraft, more staff and more support services. With economies of traffic density, the airline services provided on a route show increasing return to scale, so that cost per passenger falls as traffic density in the airline network rises. The growth induced by network expansion resembles that stimulated by a decrease in fares. Likewise, combining traffic could allow for higher load factors, while additional savings could come from efficiencies in airplane deployment, maintenance and ground support services.

Economists have examined whether airlines with larger networks or alliances achieve greater cost efficiencies than their rivals. The studies have indicated that the costs of handling additional passengers are lower for an airline operating from its hub than for other airlines operating from the same location and serving the same city pair. In addition, the cost of handling additional passengers declines with increased traffic density, particularly for flights that are of at least moderate distance. In a study of the impact of deregulation of the US airline industry, it was found that between 1977 and 1984 hub and spoke routing grew by 48% and that for every 1% increase in hub there was a 0.1% fall in airline costs (Renard, 2004)

3.9 Network rationalization and optimization

For economies of traffic density to eventuate, partners need to rationalize and optimize their network so as to collect the benefits of increased traffic. Network coordination provides an efficient and cost effective traffic system capable of meeting the requirements of local traffic and providing good transfer possibilities for connecting traffic.

In simplified terms, the alliance network functions as follows: each airline collects traffic from its network or from a variety of dispersed thin markets served by itself or its partners on the same continent – so called ‘spokes’ – routes it through central hubs and disseminated it through ‘pipeline’ routes to other hub (from which it is dispersed into ‘thin’ markets at the destination end) (Aviation Strategy, 1999).

The simple formation of an alliance and the combination of networks does not automatically add value to the participating airlines. Potential added value is dependent upon the way alliance partnerships are structured and on the partners participating. The system created should make it possible to expand service to and collect traffic from, the widest possible range of local markers. Airlines choose their partners to achieve three different objectives: major airlines operating trunk routes seek alliances with small regional airlines flying short haul routes; international airlines with no cabotage rights seek to be associated with airlines serving large domestic networks in foreign countries, and; airlines with a large presence in one part of the world often wish to team up with others in areas where they are not well represented.

Economies of density can be realized if the coordination and feed between partners is optimized or if one airline gives is a route and leaves its operations to its partner. This type of cooperation requires a high degree of partner integration, which turn is costly to establish and maintain. Another cost advantage associated with hubs is the scale effect in aircraft usage, their maintenance and turnaround. For an airline, a hub is an optimal location to establish its principal maintenance operations. The density at a hub is higher and hence the fixed costs associated with maintenance operations are spread over a larger number of aircraft. For example, equipment and buildings, specialize engineers and stock of spare parts are more efficiently managed if the facilities are located at one airport rather than being duplicated in each city. Besides, aircraft is more likely to go through a hub than stop at a specific end of line destination. A hub location also saves the costs of moving the aircraft to the maintenance site.

More importantly, by consistent schedules and aircraft, airlines can reduce their fleet requirements. An alliance offers more flights without creating the burden of having to find new aircraft, since the schedules are shared and divided among the participating airlines. An increase in density permits more intensive use of existing aircraft and crews, operating more flight hours per day (Renard, 2004). An alliance can also reduce overcapacity and increase load factor, as former competitors cooperate on routes, trying to push down average yields and simultaneously increase the average yield of certain popular routes, meanwhile also trying to prevent the entrance of new competitors in the market.

Finally, it is network configuration into the hub and spoke format that has helped shape the current system of competition between large regionally based airline networks centered on one or more hubs, with a dominant position to and from those hubs. This dominance has led to the development and has given certain airlines an almost insurmountable competitive advantage over other prospective rivals.

3.10 Hubbing

Alliances have operated to get the most out of the hubbing system and the resulting economies of density, with each partner feeding traffic to the other. From Iatrou, 2006, airline executives rated the reduction of traffic in ‘sacrificed’ hubs as the third most negative aspect of mergers. For Oneworld partners in particular, alliances outweigh mergers in terms of the positive benefits arising from hubbing. This evaluation is relatively predictable, given that Oneworld alliance controls the busiest and most important gateway to the transatlantic route. Oneworld allies also consider traffic reduction in some hubs as a threat because they are well aware that if they decide to proceed towards mergers, competition authorities will demand they give up slots in the hubs they control.

3.11 Barrier to entry

The air transport industry has certain peculiarities that make the entrance of new competitors easy and difficult at the same time. On the one hand, barriers to entry take the form of substantial capital requirements and the need for technical and technological know-how. In addition, the major incumbent airlines have an inherent competitive edge over their competitors in terms of branding, frequency and network-both are strengthened by the formation of alliances. The established airlines can use the latest technology available and offer enhanced service at a lower cost due to economies of scale. On the other hand, the homogeneous nature of the airline product makes the emergence of entirely new airlines or the incursion of new airlines on existing routes relatively easy. From passenger point of view, one aircraft is much the same as another, which places legacy airlines in something of a predicament, as any attempt to differentiate their services, like spending more on in flight catering, ground services or even advertising, immediate implies a rise in the cost base. And this seems unfeasible under current economical conditions.

The combination of economies of scale, scope and density provides allied partners with dominance at their hubs and on spoke routes from their hubs. The provision of air services necessitates a host of other complementary services, including planes, travel agent services, CRSs and airport services. Airport services include take-off and landing slots, air traffic control services, gates, passenger handling facilities, baggage handling facilities, fuel service, maintenance, cleaning and catering services and so on. These complementary services can be considered as vertically related inputs or stages of production.

3.12 Scheduling

Schedule and frequencies are the primary products of an airline and the leading factor in a passenger's choice of a particular airline. Since scheduling convenience is the most important differentiating characteristic of the airline product, all airlines strive for higher scheduled frequency on every important route, and alliances are the perfect means to achieve this increased frequency. Frequent service on a particular route helps improve the image of the airline in the eyes of passengers. By creating an extensive network through an alliance, the established airline is more likely to attract passengers. The larger networks of the major airlines allow them to increase service at a lower additional cost.

For hubbing to be exploited to the full and to attract and secure customers, there must be a hub capable of serving a large number of passengers efficiency, which requires slot availability and smooth coordination of scheduling and ground services. Coordination of the flights, gates, arrival and departure times necessary to provide an efficient hub and spoke service may require relationship specific investment. Arriving flights must be timed to coordinate with ongoing flights. Incoming flights must arrive at gates placed in close proximity to those for departing flights. Baggage from the incoming flight must be efficiently forwarded to the out-going flight. Without these smooth transitions, travelers would quite understandably fail to see the advantages of an alliance coordinated flight, preferring instead the reduced complexity of a single airline journey.

3.13 Customer loyalty

A stronger presence in a given city and a wider alliance network boost customer loyalty through FFP strategy. FFPs in combination with frequencies, connections and scheduling- that is, the competitive advantages which give alliances their lead- increase market share, create strategic advantage and reduce the potential for competition. The more extensive the network to which the FFP applies, the greater the advantage large airlines which are members of a global alliance will have over smaller, non-alliance airlines in the competition for high yield business travelers. Through coordinated FFPs, these passengers are given a rewards incentive to concentrate their flying on airlines within a particular alliance. The more global the network of the alliance becomes and the more frequent its services are, the less need there will be for passengers to resort to non-alliance airlines.

FFPs thus erect entry barriers on the demand side of the market by creating link between different aspects such as frequency and coverage. In so doing they deter entry by creating a need for airlines to establish from the outset a network of a certain size. The only real way of offsetting the disadvantage of a small network is for an airline to link its FFP with that of another airline.

As in other industries, the presence of demand side economies of scope requires that the decision to switch between suppliers brings with it a cost of some sort. Such cost is effectively a way to make customers think twice before they transfer to another source. Aside from FFPs, airlines attempt to raise the cost of switching between companies through two other means, which are collectively called ‘loyalty programs’

3.14 Learning

Apart from the tangible benefits of revenue enhancement and cost reduction, alliances bring about other equally important but less quantifiable benefits in the form of learning and specialization. Alliances promote learning on two levels, by developing technical and operational skills and the best practices and by building up alliance management skills such as ‘alliance capability’ (Kleymann and Seristo, 2004)

As the production of airline services is a highly standardized procedure that does not entail any proprietary technological know-how, the sensitive, critical knowledge of every airline as well as its core skills and assets are related to the understanding of the behavior, preferences and priorities of its customers.

Alliances can take advantage of the expertise of each airline in its respective market, to meet customer requirements in terms of schedule, comfort and service. Each partner’s inside knowledge helps the alliance to make the best choice and the best predictions for the future. This, both the alliance and the partners can meet customer needs in different markets.

3.15 Fares and pricing levels

Hansen, 1994 also looked at the effect of alliances on competition. The report found that it enhanced the market power of both Swissair and SAS. Competition in the hub-to-hub markets was effectively eliminated. This was possible as both carriers held dominant positions in their respective hubs. This finding is limited to equity alliances only and is based only on one alliance.

While equity alliances may not have any significant effect on the share value of an airline, it was found that they enhanced the partner carrier's market power. They also assessed the impact of the Swissair / SAS alliance on service quality, market concentration where partners offered connecting services. With dominance in their individual hubs, they also found that fares increased in non-stop markets served by an alliance relative to non-alliance non-stop markets. Park, 1997 found fare levels increased or decreased depending on the type of alliance agreement.

3.16 The marketing benefits of large scale and scope

These marketing advantages can be summarized as follow: attraction of widespread and interconnected network offering "all" destinations; market dominance at several hubs; ability to squeeze competitors through rescheduling, frequency increases and/or price cuts; traffic connecting through hubs supports high-frequency services; more powerful distribution system through access to numerous travel agents in several markets; ability to maximize benefits of large advertising spend; ability to ensure consistently high service standard through world-wide network despite change of aircraft/airline; extensive network creates much more attractive customer loyalty scheme, such as in frequent flyer programs.

These advantages stemmed essentially from the very large scale of their operations and the wide spread of their networks. This made the former very attractive to potential passengers who knew that these major carriers would almost certainly serve the destination or destinations they wished to fly to. The majors developed hub and spoke operations through their hub airports. Larger airlines also had better and more effective distribution systems. Because of their larger size, they had access to more travel agencies in more markets. Large size airlines also produced benefits in terms of advertising spend. A given amount of expenditure could promote more destinations/services because the network was so wide. With a much wider network and greater geographical spread through the use of one or more large hubs, the majors could ensure consistently high level service and handling standards even when passengers had to transfer between aircraft. Finally, airlines with very extensive networks had much more attractive frequent flyer programs because they offered many more opportunities both to earn points and to spend them.

International alliances offered two additional marketing advantages, enabling airlines to expand their existing market at a little extra cost and to expand into and develop new markets previously inaccessible to them. For example, the alliance between United and Lufthansa, initially launched in October 1993, has enabled United to access and develop new markets in Eastern Europe via Lufthansa’s Frankfurt hub which were previously either unavailable in terms of traffic rights or non-viable in terms of direct flights. .

To summarize, alliances have a twofold beneficial impact. By increasing each airline’s scope and network spread, they produce marketing benefits which ultimately mean more passengers and freight. At the same time, the alliance itself extends each airline’s total market by extending its geographical reach with little extra cost.

4 Alliance diversity

4.1 Horizontal, vertical and external alliances

In their efforts to improve performance and increase yields, airlines have resorted not only to horizontal, but also to vertical and external alliances. Horizontal alliances are widely defined as alliances between firms selling the same products or services in the market. As airlines tend to ally themselves with partners that have complementary networks, in order to achieve traffic feeds and access to new markets, intra-airline groupings are truly an example of horizontal alliances.

The industry has also had its share of cooperative efforts organized vertically with suppliers, distributors or buyers, as well as of external alliances drawn up with the producers in other industries.

Before looking at airlines involved in such alliance ventures, it should be pointed out that the demands for airline passenger services are derived. Airlines have been under pressure to expand vertically into other areas of the travel industry, such as hotels, travel agencies, car hire or tour organizers, in order to gain greater controls over the 'total travel product'.

The clearest examples of vertical alliances in the air transport industry are the collaborative arrangements that exist between airlines and hotels, car hire firms, travel agents and other companies involved in travel and tourism, formed in the attempt to provide total travel products and to secure for themselves greater proportions of overall consumer expenditures on travel.

In contrast, very few airlines have been able to integrate vertically with airport authorities. This is because airports are usually public owned and airlines are typically prohibited from holding equity stakes in them by governments, who also tend to veto interests in air traffic control facilities if these are transferred to the private sector.

One form of alliance pact, which merits special mention, is one between airlines and railways, or so-called intermodal alliances. Although, in theory, these should be defined as external, being alliances between two industries which offer substitute services. But, in reality, they have important vertical elements, as the one industry feeds traffic to the other. Intermodal alliances with railways have grown both in Europe and USA, as airlines and rail industries cooperate to provide quick access between airports and city centers. Access to airports through dedicated metro or train lines reduces the problems associated with local road traffic and consequently the deterioration of air quality around airports. It also provides communities living near airports with better access to city center. Nevertheless, alliances involving high-speed trains are a novel feature.

4.2 Marketing and strategic alliances

So far, airline alliances involving equity participation, mergers or marketing co-operation through code sharing or joint operations were mentioned. In practice, a very wide range of complex inter-airline agreements has grown up to meet specific airline needs over the years. Many such agreements pre-dated the period of alliance and were primarily aimed at facilitating the operation or marketing of international air services by airlines that were national in character. Agreements were sometimes purely technical and might involve provision of engineering back-up by two airlines at each other's home base or even joint maintenance for specific aircraft types in their fleets. Many agreements concerned the joint operation of cargo or passenger flights, or the operation by one airline of such services on behalf of two or more partners. One example is a scheduled freighter service between Singapore and London operated jointly by British Airways and Singapore Airlines. The majority of the inter-airline agreements are, however, essentially commercial in character and are primarily involved marketing and selling of passenger and/or cargo services. At the simplest level, it can just be a little more than a prorate agreement which fixes the revenue that one airline will pay the other for carrying the latter's ticketed passengers on a particular part of the former's network. It may also be a more complex agreement for sharing inventories on a particular flight or on several flights with or without block space agreements, whereby one partner purchases an agreed number of seats from the other on the code-shared flights. Airlines may also jointly own computer reservation systems or have joint sales offices or telephone call centers.

Each Airline has, over time, built up a complex web of interlocking agreements with other airlines covering various aspects of its operations and indifferent geographical areas. It would be difficult to argue that all such agreements represent an alliance. Many agreements clearly cut across what appears to be the accepted global alliance groupings. For example, British Airways (BA) in 1998 joined American Airlines (AA) in the Oneworld Alliance but was at that time also in partnership with United Airlines (UA) as major shareholders in Galileo, the computer reservation system (BA subsequently sold its Galileo shares in June 1999). BA handled KLM ground operations at London-Heathrow despite KLM being in a different alliance. Members of BA's Executive Club could earn air miles (frequent flyer points or FFP) on Singapore International Airline (SIA) flights even though the latter belonged to a different FFP group and was linked to the Star Alliance. BA also operated a joint freighter service with SIA. One of BA's earliest domestic franchisees was Loganair (later British Regional). At that time a subsidiary of BA's major domestic competitor, British Midland which was 40% owned by Scandinavian Air System (SAS), which was in alliance with Lufthansa. Conversely, Cathay Pacific, another Oneworld member, in 1999 had a cargo co-operation agreement with Lufthansa. Cathay and SIA, though in different global groupings, are both shareholders in Taeco and maintenance joint venture in China and in a catering joint venture. Although such apparent anomalies abound, it is evident that, gradually over time, the linkages with declared alliance partners will be strengthened and reinforced while those with non-alliance airlines will be replaced or will fade away.

To understand the complexity of inter-airline agreements, one should distinguish between those that are primarily commercial and those that are more strategic. A strategic alliance is one where the partners co-mingle their assets in order to pursue a single or joint set of business objectives. Co-mingled assets may be terminal facilities, maintenance bases, aircraft, staff, traffic rights or capital resources. If two or more airlines offer a common brand and a uniform service standard, they are co-mingling their assets and have moved into a strategic alliance. Many franchise agreements are of this kind. The franchise partners can also have a joint objective to profit from the common passenger traffic generated as a result of the franchise. Thus, despite the fact that one partner may be much smaller than the others, many franchise agreements are truly strategic. Conversely, many code-share agreements, joint FFPs and even some block space agreements are essentially marketing alliances. They are not strategic because the partners continue to operate and use their assets independently, each pursuing their own objectives.

5 Developing of mega airline alliance group in today's world

The most significant alliances in terms of network expansion are clearly those with a global scope. In this regard, the primary purpose is to achieve all the marketing benefits of scope and the cost economies from any synergies through linking two or more large airlines operating on geographically distinct markets, preferably in different continents. Global alliances would normally involve code sharing on a very large number of routes, but they ideally aim to go much further. They may include schedule co-ordination, joint sales offices and ground handling, combined frequent flyer programs, joint maintenance activities, and so on. Such alliances may include mutual equity stakes. They may be largely commercial in character, such as the Oneworld Alliance launched in 1998, or more strategic, like the Northwest - KLM alliance. The individual members of a global partnership may each have a large number of route-specific and a small number of regional alliances. Thus, the network spread and influence of a global alliance may be much wider than it is at first apparent. The aim of a global alliance is effectively linking airlines in different geographical areas so as to provide world-wide network coverage and to benefit from large size and scope. KLM's route specific, regional and global alliances as they were early in 2000 are shown in Figure 2.1.

On the basis of the above categorization, alliances such as one between Swissair and Austrian or between Lufthansa and SAS, at least when originally launched, were essentially regional in character. They linked airlines in the same region, or specifically in adjacent countries. However, these regional alliances became part of or were subsumed within wider global alliances.

During 1999, the airline industry's financial performance was beginning to falter, which then heightened the alliance frenzy. New, and in some cases unexpected, partnerships emerged as an old ones disintegrated. The major casualty was the "Atlantic Excellent" alliance linking Swissair, Sabena, Austrian Airlines and Delta. In June 1999 Delta announced it was leaving to set up a new global alliance with Air France, an airline which had stayed aloof from major groupings. Shortly afterwards, Austrian Airlines announced it was also abandoning a 44 years relationship with Swissair in order to join the Star Alliance. The Star Alliance, whose major partners included United Airlines, Lufthansa, and SAS, was busy signing up new members and by early 2000 had increased its membership to thirteen airlines. In 2000, UAL, United Airlines' parent company, announced it was buying US airways, the 6^{th} largest airline in the USA. This deal, planned to be finalized in early 2001, was subject to regulatory approval and was finally disapproved. The other major grouping under the Oneworld banner had also been actively pursuing new members. However, its two majoring partners, British Airways and American Airlines continued to face difficulties in obtaining anti-trust immunity from the United States authorities because of the repeated failures of the UK government to agree to a full "open skies" bilateral with the US. This alliance also found itself in the anomalous position of finding one of its members, Canadian Airlines, being bought in January 2000 by Air Canada, an airline belonging to Star Alliance.

If neither long term cooperation and working together nor share purchases are in themselves adequate, other aspects would be needed to cement a partnership into a real long term alliance. There are three phases in building an alliance (Figure 2.2). As an airline moves through them, alliance partners' operations become more integrated and the alliance itself becomes more durable. The first phase is oriented primarily towards generating extra revenue through network expansion and joint marketing. There may be some cost saving through joint sales offices or the sharing of lounges but the focus is solely on revenue generation. While there may be an alliance brand shared by all partners, they each maintain their separate brands and identities.

Agreements in Phase 1 are essentially commercial alliances, easily entered into and easily abandoned. An example was the Delta - Swissair - Singapore Airlines alliance, which had really not progressed beyond the first phase. This is why abandoning the alliance was relatively easy. Phase 2 is also commercial but the focus is moving onto cost savings, while continuing and reinforcing cooperation on the Phase 1 revenue aspects. The second phase will probably involve separate agreements in one or more specific areas where joint operations can reduce costs, as in ground handling or maintenance.

The greater the number of such agreements and the wider their scopes, the more difficulty it may be in breaking away from the alliance, though it is still possible. Some airline partnerships jumped into Phase 2 without implementing Phase 1. Such partnerships are opportunistic and generally focus on a single activity, such as joint ground handling involvement of the Lufthansa and Swissair through Shannon Aerospace, a jointly owned maintenance company. They may not be part of a coherent alliance strategy.

Implementation of the first two phases does not necessarily cement an alliance yet. Breaking up and separation are still possible; though the longer the alliance has been in existence the more difficult, especially if cooperation in most of the cost cutting areas has been implemented.

Phase 3 in cementing an alliance is when partners begin to co-mingle their assets and use them jointly. This will involve joint product development and the creation of joint companies to manage different aspects of their operations. For instance, Swissair and Sabena took a step towards complete integration with the launch on July 1999 of a single airline management company to run their flying operations. Other members of the Qualiflyer Group of airlines would be able to put their own services under this company later (Schorderet, 1999). The KLM - Alitalia alliance launched towards the end of 1998 aimed at creating two joint venture companies, one for passenger services and a separate one for cargo operations. At the end of July 1999, these two airlines signed an agreement which went further than any of the other global alliances in integrating the two companies' operations without being a full merger. A jointly appointed "network organizer" would provide a unified management structure for the two operating joint ventures to which each airline would offers its existing fleets and staff and those of its close subsidiaries as service providers. In the first year, each airline would be able to keep the first Euro 450 million of its earnings, but revenues above that level would be shared on a 50:50 basis (Aviation Strategy, 1999)

During this third phase, alliance partners will move from having separate brand identities to emphasizing and even adopting a single alliance brand. They may even share a single set of consolidated company accounts. Untangling such an alliance or partnership clearly becomes very difficult as the cement is beginning to set. The ultimate goal, of course, is a full merger once the nationality and ownership rules are relaxed.

There was a fourth grouping, based around the KLM - Northwest alliance. This was created as a result of Alitalia entering into an alliance with KLM at the end of

1998 and formally joining the KLM - Northwest alliance in May 1999. The exact composition and name of this alliance was still uncertain. This grouping was thrown into disarray in May 2000 when the KLM - Alitalia partnership suddenly collapsed.

Wings is a non-official name of the alliance of KLM, Northwest Airlines and Continental Airlines. KLM and Northwest have had an extensive alliance agreement since 1989, with common branding, purchasing, management, marketing and frequent flyer programs, although an equity stake that KLM has in Northwest was sold after disagreement of control of Northwest. In 1999, Northwest airlines bought a stake in Continental Airlines, and announced cooperation including code sharing and frequent flyer participation. In 1998, KLM and Alitalia concluded an alliance agreement, setting up passenger and cargo joint-ventures to manage the airlines operations and marketing but the agreement was dismantled in August 2000. KLM and Northwest received antitrust immunity from the US Department of Transportation in November 1993. And there has been consolidation of the alliance in 2004 when Wings gradually dissolved as KLM and Air France have effectively merged with the former and joining Skyteam. Northwest and Continental were also joining Skyteam in 2005.

To put this into a wider context, there are over 1200 airline operators in the world. By 2002, four groups had emerged, namely: Star Alliance, One World Alliance, The Sky Team Alliance and The Qualifying Group. Currently, after KLM - Air France merging in early 2004 and following with Lufthansa and Swiss merging in early 2005, The Qualifying Group was disintegrated, and it evolved into three major global alliance groups: Star Alliance, One World Alliance, The Sky Team Alliance.

Having learned from experience, several carriers started looking for deeper, more meaningful and mutually beneficial relationships with real economic and financial paybacks. The carriers often found them in numerous small agreements rather than in the grand strategic marketing alliances. Increasingly, airlines were out for concrete results.

Before proceeding to describe current airline alliances, it should be pointed out that the airline industry is a highly fragmented one. The six largest companies account for 30% of the sector's global revenue, compared with 79% in the petroleum industry and 62% in the automobile industry. On an alliance level, however, it may be observed that the three major alliance groupings currently control 55% of the world revenue-passenger-kilometers (RPK). These data indicates that, though it may still be premature to talk about 'companies', alliances have begun to reverse the state of atomization and take the air transport industry in the direction of some form of polarization.

All current airline alliances are centered on at least one major European and one major North American members. This is because intra-North American traffic, intra-European traffic and North American to European traffic together account for 56% of total world traffic flows.

As described earlier, the past 20 years or so have witnessed the formation of many airline alliances, some of which have fallen by the wayside and others have taken on different configurations as airlines continued to experiment with new partners. Currently, however, the air transport industry appears to be stabilized around the formations shown below. The period between 1995 and 1998 saw a remarkable increase in alliance survival rates. The overall rate improved from 38% in the 1992-1995 periods to 68% in the 1995-1998 periods.

From the summary of the agreements currently enforced between 120 passenger airlines. They clearly show that the numbers of cooperative agreements among airlines tend to constantly increase and that the most popular form of agreement is also the most tactical, namely code sharing.

Although fewer equity alliances are now formed, they have a higher survival rate than non-equity alliances. Equity investments seem to be common among regional to intra-continental alliances, partially in an effort to secure the stability of feeder networks.

In the future, it seems likely that major strategic alliances will become more stable as partners gain motivation to remain within such groupings. In the earlier stages of the alliance frenzy, many airlines participated in the race of forming or joining alliances simply because they feared of being left behind. Others formed multiple alliances with different airlines, without following a master plan. The cost of leaving a major alliance is likely to become more prohibitive, as the possibility of joining a comparably attractive coalition diminishes over time. And even though the costs attached to a voluntary exit from a multilateral coalition may remain modest, bilateral deals between some of the members often result in substantial break-up fees. These are reasons for global alliances to become less volatile and longer lasting. Furthermore, having filled some of the gaps in their global coverage, alliances are now going through a stabilizing phase designed to raise the level of integration amongst partners in order to obtain more of the potential benefits alliances are able to offer, or in other words to move from marketing alliances to true strategic partnerships.

At the same time, it should be noted that the situation is still evolving. The figure below shows that, even when airlines belong to a certain alliance, they still value their independence and maintain relationships and agreements with airlines from other alliances in an attempt to remain flexible and adaptable in a fast-changing industry.

5.1 Star Alliance

In 1996, Lufthansa formed an alliance with United Airlines. In May 1997, Star Alliance was launched by Air Canada, Lufthansa, SAS, Thai Airways and United Airlines as founding members, with the aim of creating the first global airline network. Through This alliance, Lufthansa aspired "to achieve the building-up of its geographical ploys and to structure its strategy against its large competitors" (Boyayard, 1996). Varig, the sixth member, joined the alliance in 1997, followed by Ansett Australia and Air New Zealand in March 1999. Ansett ceased operations in March 2002, initiating a loss which put Star Alliances at disadvantage in Australia, previously one of their strongest regions. All Nippon Airways, a mainly domestic airline until that time, became a member on October 1999. Austrian Airlines Group including Lauda Air and Tyrolean Airways added its weight to the alliance in March 2000 and Singapore Airlines followed suit on April 2000. BMI British midland and Mexicana joined on July 2000 (The later left four years later after deciding not to renew its code share agreement with United and opting for American Airlines instead). Additional recruits included Asiana Airlines, LOT Polish Airlines and Spanair in 2003, US Airways in 2004 and TAP Portugal in 2005. Varig, meanwhile, ceased to be a member of Star Alliance as of January, 2007, following its bankruptcy proceedings. The decision was prompted by the restructuring of the Brazilian airline, as 'old' Varig had continued for a while to be a Star Alliance member, operating a reduced flight schedule on behalf of the 'new' Varig. Thus, Star Alliance rightfully lays claim to being the world's largest airline group, comprising seventeen members with South

African Airways and Swiss International Air Lines as its most recent new entrants in April 2006. In the course of 2006, Air China, Shanghai Airlines and THY Turkish Airlines formally announced their intention to enter the coalition. Furthermore, it has recently launched a ‘second tier’ membership program aimed at accommodating regional airlines within the alliance. The Slovenian carrier Adria Airways and Finland’s Blue1 and Croatia Airlines are the first three carriers that have chosen to adhere.

Within the alliance framework, an even closer cooperation agreement between Lufthansa and SAS requires that the two partners pool their products and services as well as their cargo/freight systems. The partners aimed to make Frankfurt (Lufthansa’s hub) the turning point for their international flights and Copenhagen the hub for flights to China and Japan, given that Asia was SAS’s weak point. They had also agreed to harmonize their frequent flyer programs and did not rule out the possibility of integrating them in the future.

Four Star Alliance airlines – Air Canada, Austrian Airlines, Lufthansa and SAS – have recently announced that they are joining forces to place an order for a common specification aircraft in the 70-120 seat size. The benefits of such a move include cost savings through operational, maintenance and training opportunities, the ability to dry-lease common-specified aircraft among Star Alliance partners, increased residual values for such aircraft, and the opportunity to swap delivery slots.

Overall, Star Alliance is a well established, thoroughly constructed airline grouping which can count on over 2,800 aircraft to transport 425 million passengers per year to 842 airports in 152 countries across the globe. It features extensive code share agreements, mutual earn/burn facilities on loyalty programs, access to over 660 lounges, ‘round the world’ fares for global travelers, through check-in and streamlined airport operations. The cooperation agreement also involves joint purchasing, brand and advertising initiatives and cargo. By having a strong geographical foundation and hubs throughout the world, including Frankfurt, London Heathrow, Los Angles, Chicago O’Hare, Singapore, Tokyo Narita, Bangkok, etc., Star Alliance has multiplies its position of being operational on a global scale. And according to its officials, “the Alliance will never be completed. We are dynamic and have to respond to customer needs”.

As the largest alliance, Star Alliance wins the network contest, occupying the top rank in terms of sheer frequency, system capacity and destinations served. It also leads on the number of destinations covered by more than one partner, a potentially important factor in the forging of inter airline connections and the development of critical mass at hubs where the individual partners alone have little presence.

The size itself of Star Alliance, however, makes governance more complicated and may act as a deterrent for airlines wishing to enter the alliance. When Cathay Pacific was being courted by the other two alliances in the late 1990s, it was put off by the bulk of Star Alliance and the potential complexity a mass of bilateral agreements implied. It chose instead to join Oneworld, which is more straightforward links to British Airways and Qantas. Star Alliance has lately become more flexible in implementing initiatives across the board and now allows certain projects to take place and be labeled with the alliance’s umbrella brand – even when they do not involve all members. To increase cohesion and to separate it’s supervisory and management functions, the alliance set up a management team composed of high-level executives from United Airlines and Lufthansa in June 2000.

Star Alliance partners and their dates of membership are listed below along with data on revenue passenger kilometers (PRK), passengers flown and revenue.

5.2 OneWorld

This global marketing alliance was announced in September 1998 and officially launched in February 1999. It featured British Airways and American Airlines as core members, with Iberia, Finnair, Canadian Airlines, Cathay Pacific and Qantas as additional partners. On June 2000, Lan Chile and Aer Lingus also joined. Canadian Airlines left Oneworld on the same date after being taken over by Air Canada. In September 2003, Swiss International Airlines accepted an invitation to become the ninth member of the group, simultaneously entering a number of business agreements designed to tighten bilateral consolidation with British Airways. Subsequently, the move by Swiss International Airlines, in June 2004, to interrupt the Oneworld membership process and terminate its relationship with BA thus proved to be something of a showstopper. The latest recruiting efforts have seen Oneworld reclaiming center stage, with the announcement that Malev, Royal Jordanian and Japan Airlines would join the alliance in April 2007. On the same date, Aer Lingus withdrew from Oneworld, since its focus of low fare point-to-point passengers no longer fell in line with the alliance's strategy of providing services for premium, multi-sector, frequent international travelers. Oneworld, possibly inspired by SkyTeam and Star Alliance, will in turn accommodate a second layer of partners, called Affiliate members, in which Dragonair, LAN Argentina and LAN Ecuador were expected to join the alliance. Oneworld also set up a centralized management team in Vancouver shortly after the alliance was launched in early 2000.

The partners offer a closer linking of frequent flyer programs, a reciprocal access to airport lounges, smoother transfers between airlines and a range of global products including ‘Oneworld Explorer’ fares. The alliance serves 605 destinations in 134 countries and offers its customers 392 lounges (Oneworld, 2006). It occupies a stronghold position at the very much envied (traffic-wise) airport of London Heathrow. However, there is no cargo alliance, nor is the exchange of equity or any other form of multilateral cross-share holding. Significantly, its ability to achieve full effectiveness is hampered by the lack of immunity from the US Department of Transportation, with cooperation and code share agreements between the two English and American ‘pillars’ therefore remaining wholly competitive. At this stage, it is highly unlikely that an antitrust immunity will be granted, given that there is no open skies pact between the UK and the US, which remains a necessary precondition for any airlines attempting to receive an antitrust immunity. It is for this reason that, until recent cooperation between the members, alliance airlines focused mainly on marketing agreements. Only lately have the partners begin to deepen the bond they share, working to strengthen bilateral ties between members.

The most important assets for the alliance are the particularly complementary fit between the networks of British Airways and American Airlines, and their solid position, where British Airways is strong in Europe and Middle East, while American Airlines is strong in the US and Latin/South America.

Oneworld is also developing common engineering specifications to cut maintenance costs via bulk purchasing and maintenance part sharing in order to leverage the cost-saving potential for the partnership. The alliance claims that its partners have saved around US$300 million through joint purchasing over the first three years since its inception in 2000 (Baker and Field, 2003). The partners are aligning their policies and processes to allow closer cooperation and the sharing of best practices.

The members of Oneworld are presented in the table below, along with information regarding the date they joined the alliance, revenue passenger kilometers (RPK), passengers flown and revenue.

5.3 Sky Team

This is the most recent global alliance, which started when Air France and Delta Airlines began cooperating in 1999 and formed a partnership in 2000. Air France was the only major airline that had previously refrained from entering an alliance because of the need to maintain a protective France-US bilateral stance while it was being restructured in preparation for privatization. The two carriers extended the reach of their alliance with the additions of Aeromexico and Korean Air. CSA Czech Airlines and Alitalia joined in 2004. Furthermore, there was a consolidation of the alliance in 2004 with Wings gradually dissolved as KLM and Air France effectively merged with the former joining SkyTeam. Northwest Airlines and Continental Airlines also joined in 2005. The alliance focuses on passenger and cargo services, taking advantage of the growth potential of Paris Charles de Gaulle as a connection platform. SkyTeam currently offers 14,615 daily flights to more than 728 destinations in 149 countries. It provides access to 400 airport lounges (SkyTeam, 2006). The cooperation agreement includes extensive code sharing, reciprocal frequent flyer programs, joint customer service at airports and common branding. All members except Continental Airlines are also members of SkyTeam Cargo. In September 2000, some of the members announced the creation of a US cargo joint venture, focusing on marketing their cargo services in the United States and internationally.

The fact that this alliance controls Europe’s largest domestic market share is one of its major strengths. Another advantage is that both Air France’s hub and that of Korean Air are among the very few large scale structures with room for further growth in the sense that they have the potential to add runways and gates, and therefore additional flights. SkyTeam is the only alliance in which three quarters of the members have obtained antitrust immunity. This is also the first time that antitrust immunity has been extended to a US and an Asian airline operating in the Pacific region, thus making SkyTeam the only alliance with both trans-Atlantic and trans-Pacific antitrust immunity.

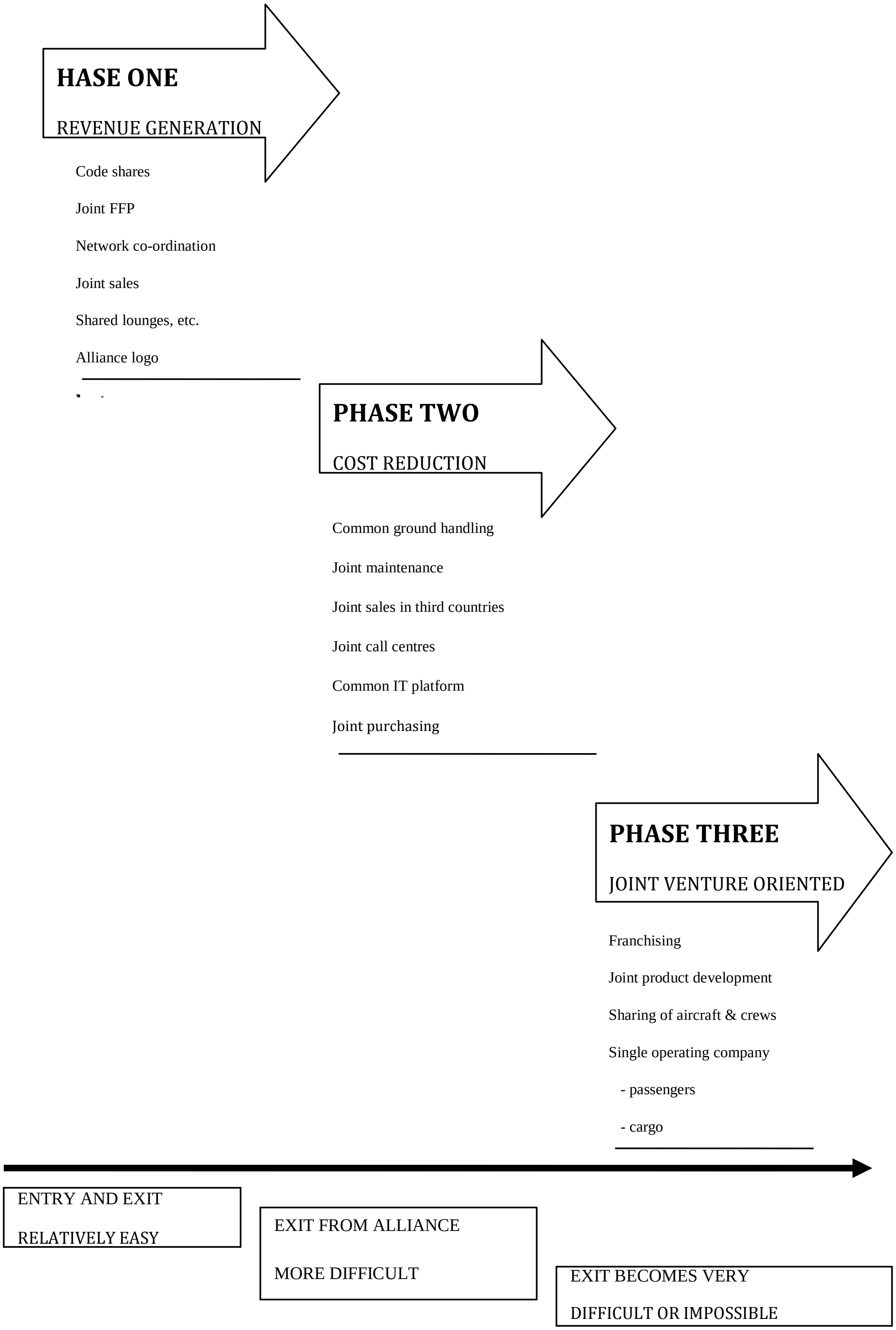
Aeroflot joined SkyTeam in April 2006, and China Southern was the next new addition, with membership taking place in late 2007. Like Star Alliance, SkyTeam has also launched a second membership tier, called the Associate program, targeting geographically focused airlines. On February 2007, Spain's Air Europa, Panama's Copa and Kenya's Kenya Airways signed agreements outlining their commitment to join SkyTeam as associates, through sponsorship by one of the members. And then Romania's Tarom and Lebanon's Middle East Airlines were made an announcement to join the alliances.

Table 2.5 shows that 30% of 70% of the total asset share in North America belong to SkyTeam. That is because of cooperation of big airlines such as Delta Airlines, Northwest Airlines and Continental Airlines.

In conclusion, among the three major alliances, Star Alliance has most assets in Asia and South America. Oneworld controls the largest share in Africa, Oceania. SkyTeam has the largest share in North America. However, in Europe, all three alliances have pretty much the same share.

From figure 2.4 and 2.6, Star Alliance has the highest number of destination than others alliance, covering 772 destinations in 133 countries, and serves with 2,477 planes. Oneworld serves 1855 planes for 548 destinations in 131 countries. Other 645 destinations in 138 countries around the world are served by 2064 planes of Skyteam member's airlines. The departure flights and number of passenger of three alliances can be seen as the figure below.

Figure 2.1 Three phases of building an alliance (From: Airline Business in the 21st century)



Inter-airline agreements fall along a spectrum, starting with a very straightforward marketing alliance explaining figure 2.1

INTERLINE / PRORATE: This is the simplest alliances covering one route or a limited number of city pairs. Pro-rates are the prices or tariffs airlines agree to charge for carrying each other's passengers on their own aircraft.

MUTUAL GROUND HANDLING: Agreement between airlines to handle ground services, such as check-in, baggage handling, aircraft maintenance and customer services, at the arrival and departure airports.

FREQUENT FLYER PROGRAMS: Customers can earn miles or points when flying with the member airlines. Miles or points can also be redeemed on any member airlines. Miles or points earned on member airlines are counted toward elite status in one selected frequent flyer program. And elite status is transparent between member airlines.

CODE SHARE: An agreement between airlines to sell spaces on each other's flights. The flights will have both the operating carrier's flight number (the airline that is using its aircraft for the flight), and the code sharing flight number (the partner airline in the agreement sells space on the flight as if it were its own, and has its own flight number).

BLOCK SPACE: One airline buys a specified number of seats from the other, irrespective of whether they are filled, at a specified price.

COMMON SALES / TICKETING OUTLETS: Thanks to the development and the use of the same computer reservation systems (CRS), an airline can gain access to the schedules of all member airlines and even allow the purchasing of tickets regardless where and with which airlines.

SCHEDULE / CAPACITY CO-ORIDINATION: This Agreement is among airlines indicating when to fly and which aircraft to use on the same route.

JOINT ENGINEERING: This agreement is when an airline flies to partner's hub, all maintenance and engineering will be operated by partners.

JOINT FLIGHTS: This is similar to a codeshare but at a more cooperative level, a the joint flight is when 2 airlines operate on the same aircraft using 2 flight number and service is provided by both airlines.

FRANCHISING: The second kind of regional alliance is a franchise agreement between a larger carrier and a regional or feeder operator. The later adopts the livery, brand and service standards of the franchiser and normally only carries the latter's flight code.

COMMON BRANDING: Airlines decide to use the name of the group and do marketing together, in order to reduce advertisement costs and promote group branding.

FULL MERGER: When two airlines have decided to combine the asset together.

Figure 2.2 Determinants of airline profitability

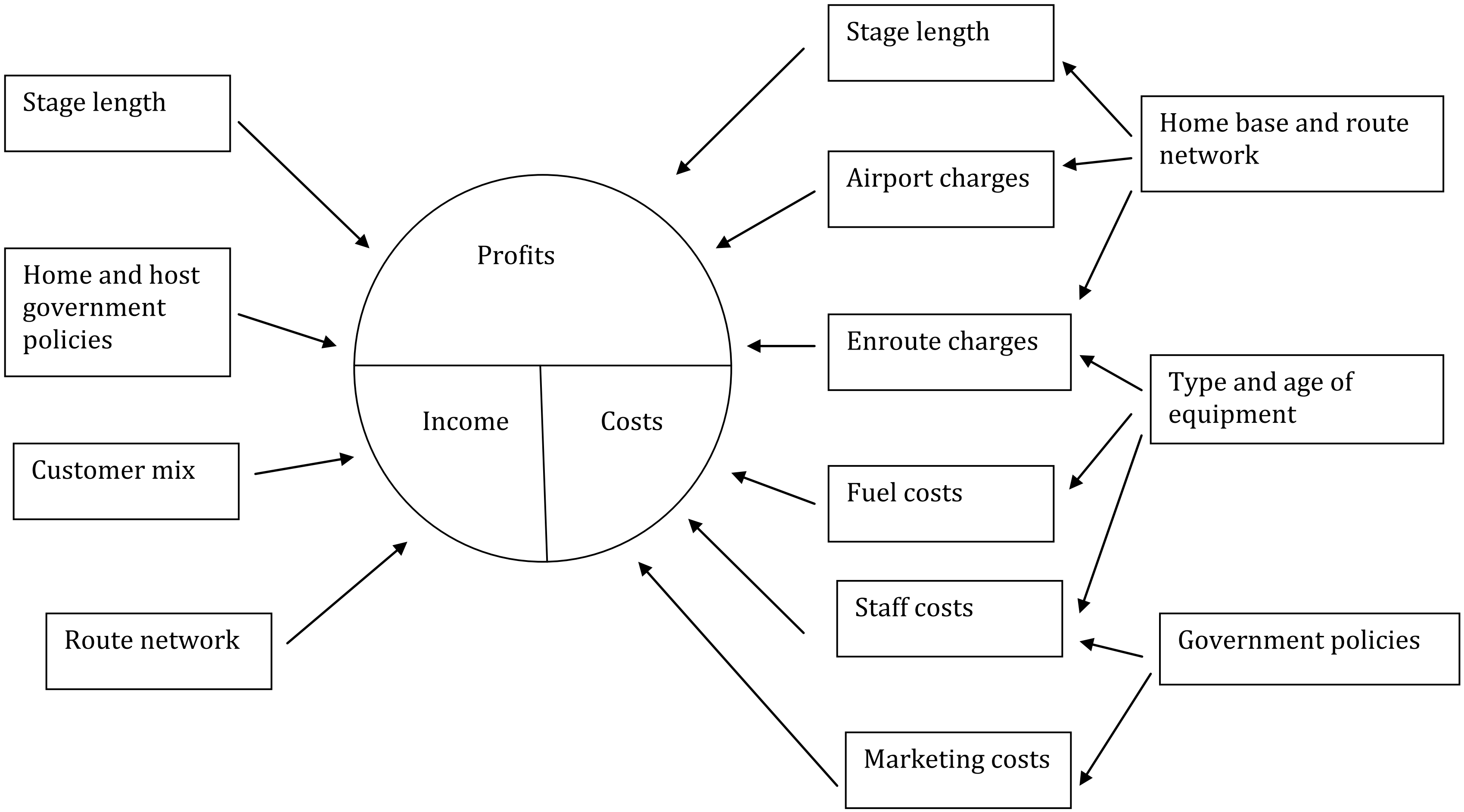


Figure 2.3 US airlines' cost components

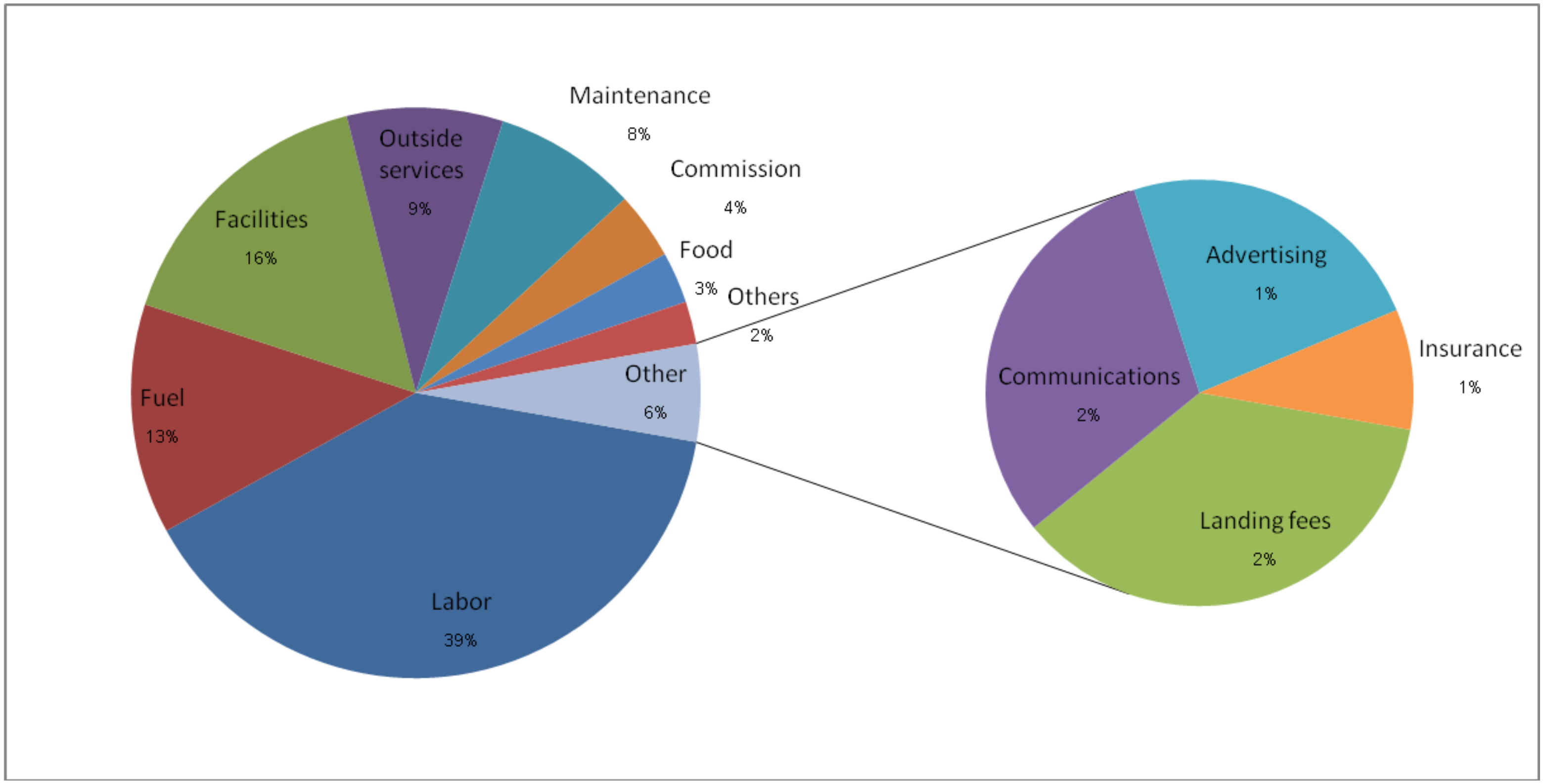
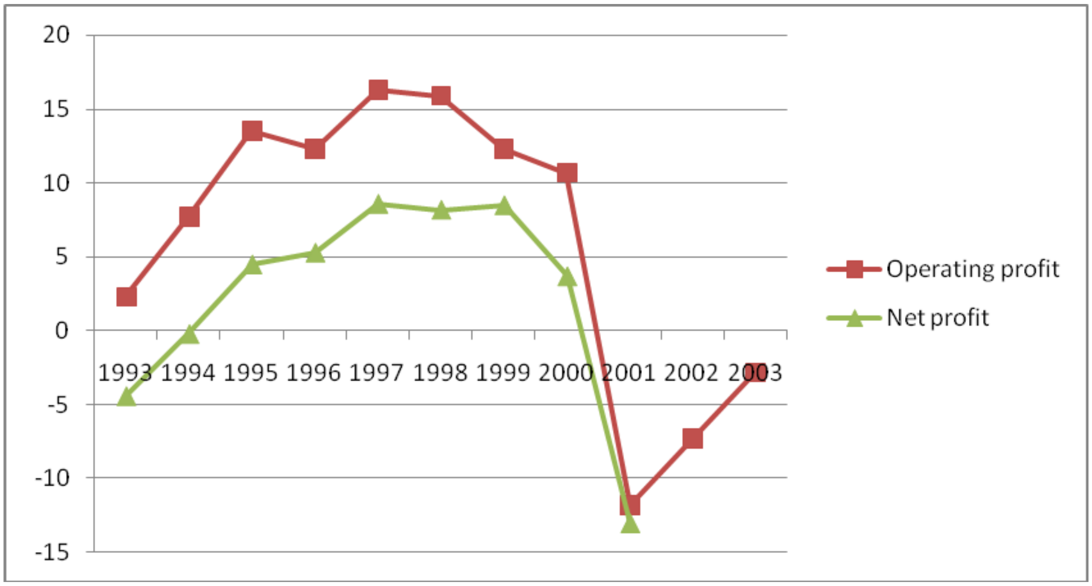


Figure 2.4 Profitability of airlines worldwide

Profitability (%)



Year	Operating profit	Net profit
1993	2.3	-4.4
1994	7.7	-0.2
1995	13.5	4.5
1996	12.3	5.3
1997	16.3	8.6
1998	15.9	8.2
1999	12.3	8.5
2000	10.7	3.7
2001	-11.8	-13
2002	-7.3	
2003	-2.8	

Table 2.1 Airline members of world's major alliances

Star Alliances	One World	Sky Team
UA United Airlines	CX Cathay Pacific	AF Air France
TG Thai Airways International	BA British Airways	AM Aeroméxico
TP TAP Portugal	AY Finnair	AZ Alitalia
TK Turkish Airlines	AA American Airlines	CZ China Southern Airlines
SQ Singapore Airlines	IB Iberia Airlines	DL Delta Air Lines
SK Scandinavian Airlines System	JL Japan Airlines	KE Korean Air
SA South African Airways	LA LAN Airlines	KL KLM
OZ Asiana Airlines	QF Qantas	KQ Kenya Airways
OU Croatia Airlines	RJ Royal Jordanian	OK Czech Airlines
OS Austrian Airlines	MX Mexicana de Aviación	SU Aeroflot Russian Airlines
NZ Air New Zealand	MA Malév Hungarian Airlines	UX Air Europa
NH All Nippon Airways		
MS Egyptair		
LX Swiss International Airlines		
LO LOT Polish Airlines		
LH Lufthansa		
KF Bluel		
JP Adria Airways		
JK Spanair		
FM Shanghai Airlines		
CA Air China		
BD BMI		
AC Air Canada		
US US Airways		

Figure 2.5 Show the code-sharing linkage from each alliance, please see table 2.1 for abbreviation standing.

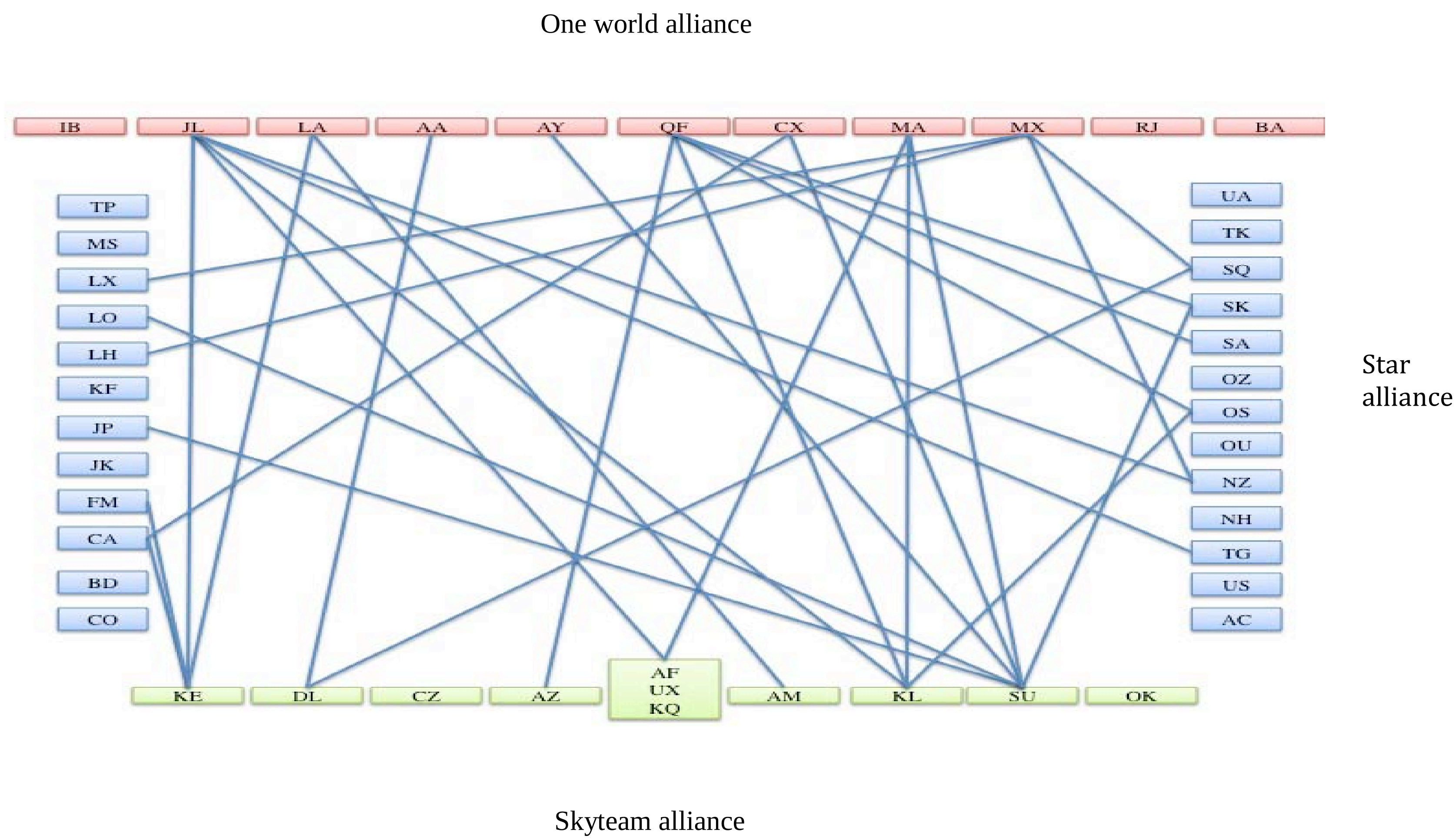


Table 2.2 Star Alliance time frames

October 1992	Air Canada and United Airlines unveil an alliance agreement
October 1993	Lufthansa and United announce a comprehensive marketing agreement including code-sharing: the first VARIG and Lufthansa code-share flights begin
June 1994	The first United and Lufthansa code-share flights begin
January 1995	Thai Airways International and Ansett Australia sign a Memorandum of Understanding to collaborate on code-sharing, schedule coordination and joint marketing
May 1995	SAS and Lufthansa announce a far-reaching strategic alliance including code-sharing. United and Air Canada expand code-sharing
March 1996	Lufthansa and Air Canada announce a comprehensive alliance
May 1996	The United-Lufthansa alliance receives anti-trust immunity from the U.S. Department of Transportation
November 1996	United, Lufthansa and SAS are awarded trilateral anti-antitrust immunity by the U.S. Department of Transportation
May 14, 1997	Air Canada, Lufthansa, SAS, Thai Airways International and United Airlines launch the Star Alliance Network
October 1997	VARIG joins the Star Alliance network
March 1999	Ansett Australia and Air New Zealand join the Star Alliance network
October 1999	ANA joins the Star Alliance network
March 2000	The Austrian Airlines Group, comprising Austrian Airlines, Lauda Air and Tyrolean Airways becomes the 10th member of Star Alliance
April 2000	Singapore joins Star Alliance
July 2000	British Midland and Mexicana Airlines become the Star Alliance members
August 2001	Official opening of the first Star Alliance lounge in Zurich
March 2003	Asiana Airlines joins the Star Alliance network
April 2003	Spanair joins the Star Alliance
October 2003	LOT Polish Airlines joins the Star Alliance
March 2004	Mexicana Airlines membership in alliance terminates
November 2004	Blue 1 joins as the first regional member of Star Alliance. Then follow with Adria and Croatia Airlines

Table 2.3 OneWorld time frames

September 1998	American airlines, British Airways, Cathay Pacific, Canadian Airlines and Qantas announce their intention to form oneworld
February 1, 1999	Oneworld is born. Founding members start offering the alliance's services and benefits
September 1999	Finnair and Iberia start offering Oneworld services and benefits
June 2000	Aer Lingus and Lan Chile join Oneworld
June 2000	Canadian withdraws following its purchase by Air Canada
November 2001	Oneworld's network expands with the integration of the former TWA operation into American Airlines
August 2002	American Airlines and Finnair granted anti-trust immunity
November 2002	American Airlines and British Airways apply for US regulatory approval code-share on "behind and beyond" services and transatlantic flights serving UK regional destinations
December 2003	British Airways and Iberia granted the European equivalent of anti-trust immunity
June 2004	Swiss released from its commitment to join Oneworld after an agreement between the airline and established Oneworld partner British Airways to drop the bilateral commercial agreement they signed I October 2003, which was a fundamental condition of it becoming a member of the global alliance. All code-shares and bilateral relationships between SWISS and the other existing individual Oneworld partners remain in place.
September 2004	British Airways sells its 18.25% shareholding in Qantas, but the two airlines stress their alliance remains unaffected, with the joint services agreement governing their co-operation between Australia and Europe recently approved by the Australian regulators approved for a further five years

Table 2.4 Skyteam time frames

June 22, 1999	Air France and Delta Airlines signed an exclusive long-term strategic agreement that laid the foundations for a major global alliance
June 22, 2000	The CEOs of Aero Mexico, Air France Delta Airlines and Korean air announce the formation of SkyTeam.
March 2001	CSA Czech Airlines was officially welcomed as AkyTeam's fifth member
July 2001	Alitalia joins the alliance.
January 2002	The U.S. department of Transportation approved Air France, Alitalia, CSA Czech Airlines and Delta application for trans-Pacific antitrust immunity
February 2004	The European Commission and U.S. Department of Justice approved the Air France-KLM Royal Dutch Airlines intended merger. With the merger, KLM and Air France will form the first pan-European airline grouping, leading to KLM entering SkyTeam
May 4, 2004	Air France and KLM Royal Dutch Airlines announced the success of the Exchange Offer for KLM common shares by Air France. It was also announced that KLM, along with Continental and Northwest, would join SkyTeam in September 2004
September 2004	Continental, KLM and Northwest airlines become full members

Table 2.5 Asset share for alliance in each region as of quarter 4, 2008

Region	Star Alliance	Oneworld	Skyteam	Others	Total
North America	21%	17%	30%	32%	100%
South America	21%	10%	0%	69%	100%
Europe	18%	17%	15%	50%	100%
Asia	27%	5%	6%	62%	100%
Middle East	2%	1%	0%	97%	100%
Africa	2%	7%	0%	91%	100%
Oceania	12%	33%	1%	54%	100%

Source; International Air Transportation Association (IATA)

Figure 2.6 Number of destinations and countries that serve in each alliance in 2008

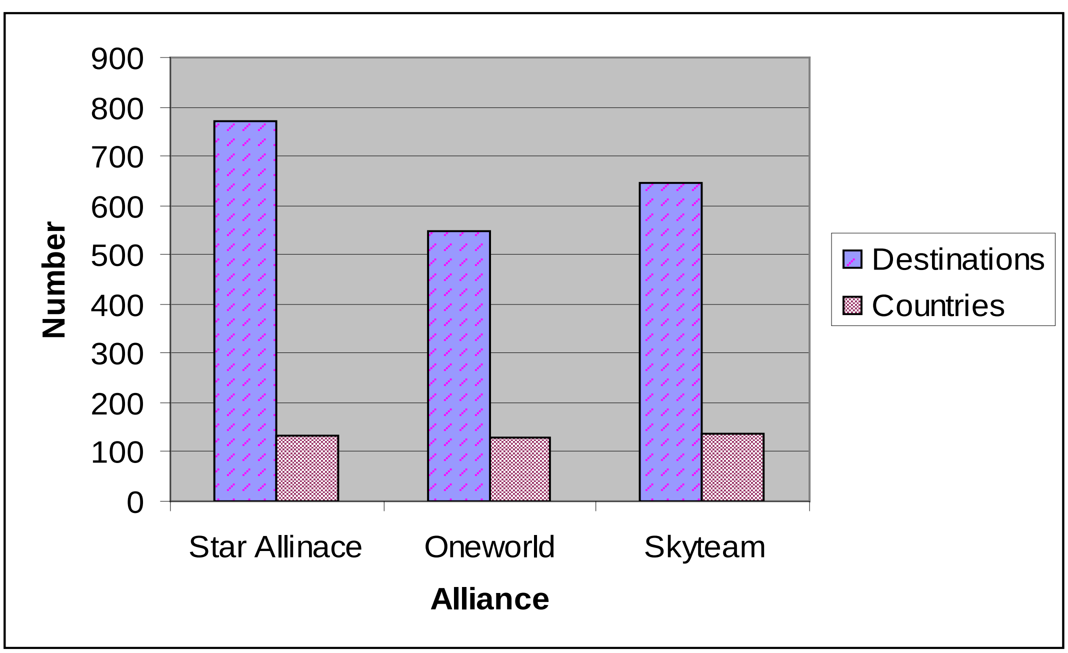


Figure 2.7 Number of aircraft service in each alliance in 2008

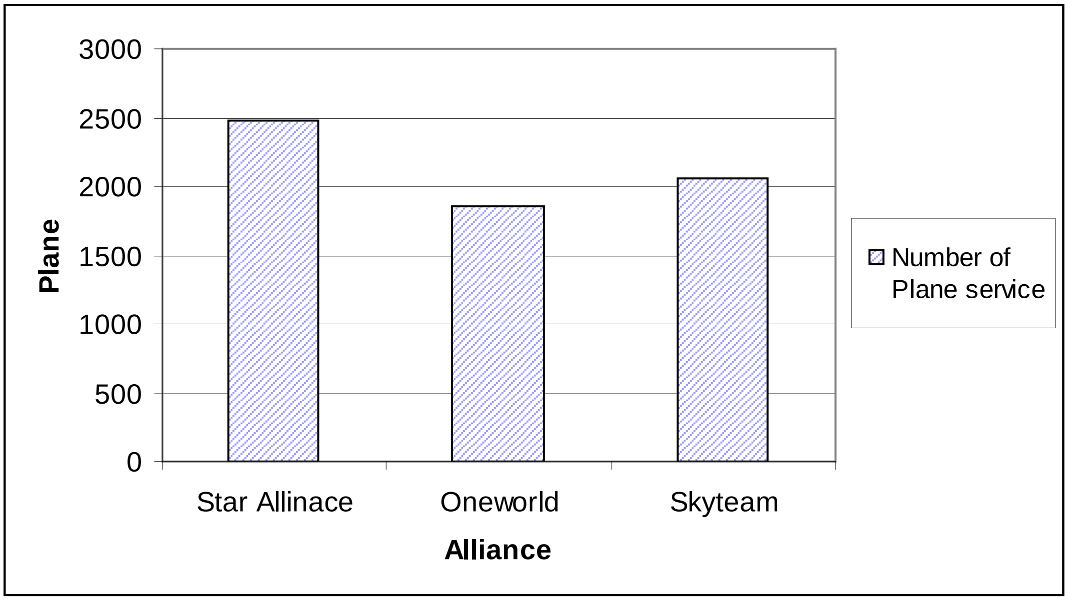


Figure 2.8 Average of number of departure flight per day in December 2008

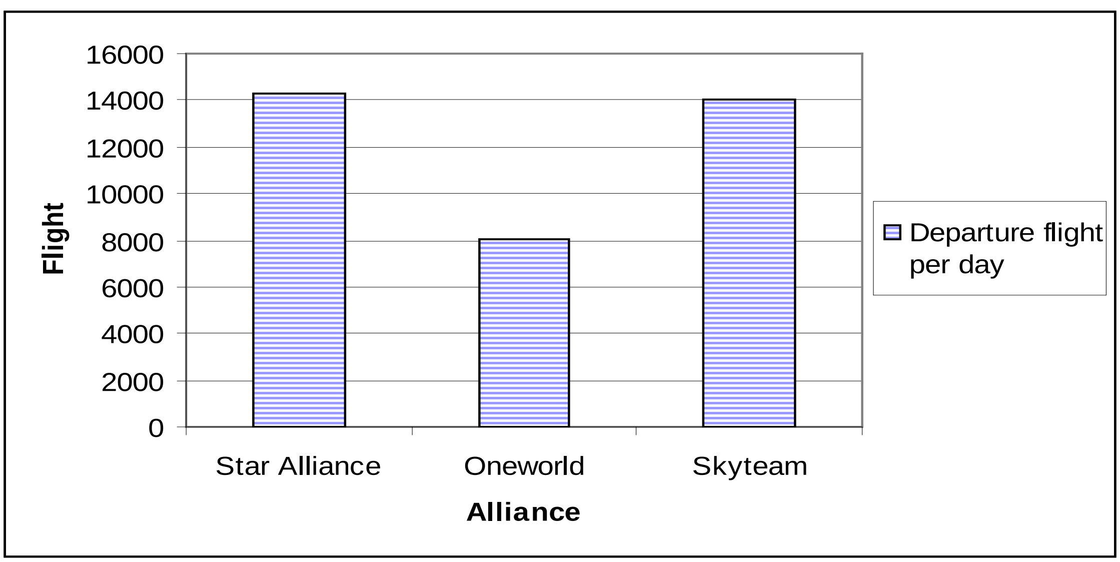
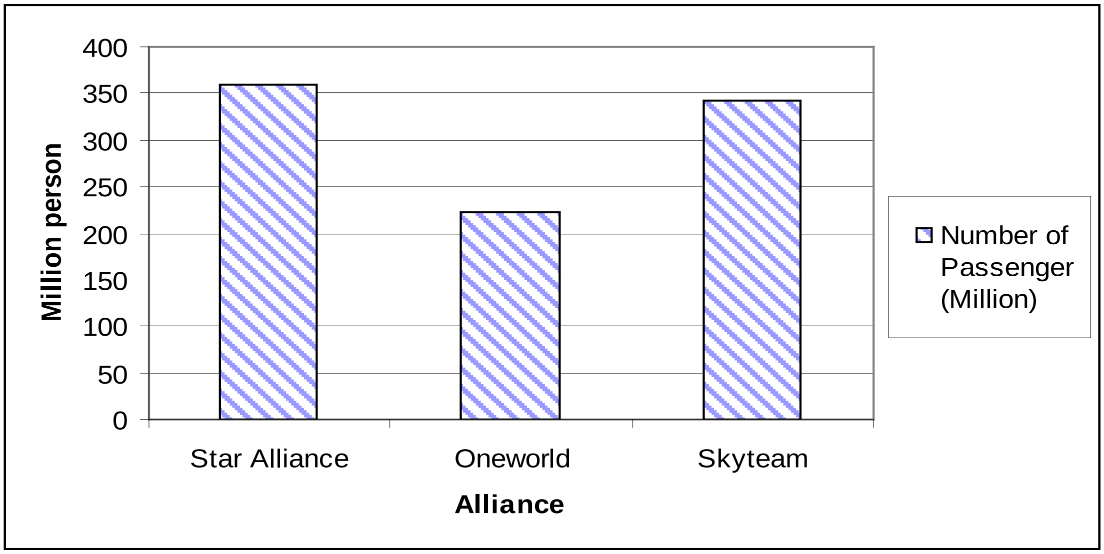


Figure 2.9 Number of passengers in 2008



Appendix A

Major studies of airline alliances

Study	**Analysis**	**Sample**	**Period of study**	**Findings**
Oster and Pickerell (1986)	Conceptual			Nearly all the 50 largest carriers formed code-sharing alliances with a major airline by 1985
Pustay (1992)	Conceptual			Identified the following impediments of true globalization: infrastructure limitations, traffic rights, foreign ownership of flag carriers, antitrust, threat of government intervention to prevent emergence of global carriers
Gellman research associates (1994)	Counterfactual study : 2 transatlantic malliances	BA/USAir KLM/NW	1994	Profitability increase for all parties with BA and KLM gaining more than their partners in terms of net profit
Youssef and Hansen (1994)	Case Study: simple linear regression	Swissair and SAS	1989-1991	Increases in flight frequency; variation in fare levels; the strongest service levels had the lowest fare increases. Points to the redistributive nature of alliance impacts
US General Accounting Office (1995)	Intensive interviews with key people	KLM/NW, USAir/BA, UA/ Lufthansa UA/Ansett UA/BMA	1994	All carriers in the 5 alliances enjoyed increased revenues and traffic gained at competitor's expense, not industry growth

Study	Analysis	Sample	Period of study	Findings
Dresner et al. (1995)	Empirical; categorical variables	Continental/SAS, Delta/Swissair, KLM/NW	1987-1991	Mixed successes with traffic volumes. Comment; restricted to equity alliances between US and Europe. In general, alliances did not benefit partners
Dresner et al. (1995)	Conceptual			Observed that initial alliance studies indicated little benefit to airlines but later studies showed improvement.
Oum, Yu (1995)	Empirical	23 major airlines	1986-1993	Major European and Asia have higher productivity growth than North America airlines. However, north America airlines have higher productive efficiency than the carriers in Asian and European but the gap is closing very rapidly. Asian carriers enjoy unit cost advantages over another carrier.
Park (1997)	Estimated econometric models	Panel data of KLM/NW/DELTA/Swissair/Sabena	1990-1994	Traffic increases at the expenses of rival airlines. Complementary alliance-lower airfares. Parallel alliances-increased airfares
Oum et al. (2000)	Empirical: econometric models; regression	2 airlines	1986-1995	Increased profitability, increased productivity, decrease in pricing levels
Oum et al. (2000)	Event study	Database of 58 Alliances	1989-1998	Positive abnormal return of 0.40% on event day 0
Oum et al. (2000)	Empirical study	Panel data of 4 major alliances	1992-1994	Increased traffic on alliance routes

Study	Analysis	Sample	Period of study	Findings
Brueckner and Whalen (2000)	Empirical	3rd qtr fare data US Department of Transportation	1999	Alliance partners charge approximately 25% lower interline fares compeered to those charged by non-allied carriers
Goh and Uncles (2003)	Survey	Business travelers in Australian		Minorities are unsure of the benefits or misconceptions, vary by nature of benefit and type of respondent. No major differences are perceived in the benefits offered by competing global alliances. Relative to other benefits, alliance benefits are not seen as particularly important.
Gilbert and Wong (2003)	Survey and Empirical Study	Passengers departing at Hong Kong airport	September 2001	No significantly differences between passengers who made and who do not made their own airline choice. But there are significant differences among passengers of different ethnic groups/nationalities, different purpose. They rank 'assurance' as the most important service dimension.
Park, Robertson and Wu (2004)	Empirical	Passenger Survey in Korea	2004	Service value, passenger satisfaction, and airline image are each found to have a direct effect on air passengers' decision-making process
Balfour (2004)	Law	EC competition law		Too early to tell whether the commission has been successful, but it has to achieve a delicate balance between permitting some consolidation in the excessively fragmented European market and ensuring that competition is sufficiently protected.

Study	Analysis	Sample	Period of study	Findings
Oum et al. (2004)	Enpirical	World top 30 airlines	1991-1995	Horizontal alliance make a significant contribution to productivity gains but no overall significant on profitability. Level of cooperation in horizontal alliances influences the strength of alliance effect on productivity and profitability.
Wen and Hsu (2006)	Network design programming	Two partner airlines in an alliance negotiation		The study provides ways by which alliance airlines can evaluate iteratively the output and profits of the alliance members under code-share agreements.

Chapter 3

Airline Alliance Consolidation's Effect On Companies' Productivity And Profitability

Introduction

The airline industry is a vital part of the world economy. In 2006, there were approximately 1,200 scheduled airlines in operation worldwide, of which 300 served international markets. The existence of the commercial airline industry is the reason for the existence of airports, air traffic control and navigation systems, and commercial aircraft industries. The airline industry plays a key role in the world economy, industry, tourism and related activities, by facilitating trade between cities and countries as well as stimulating the transfer of people, goods and ideas across different geographic regions. Recently, the airline industry has faced more competition and the recent recession has led to widespread severe losses across the entire industry. This has forced many airlines to undertake major restructurings in a bid to improve productivity and reduce costs. An alliance is one of many network expansion strategies when an internal route development or an acquisition is not a viable option. Quite often, this is the case even if the internal expansion is possible, especially while alliances may be preferable as they provide quicker and more secure access to new markets. Furthermore, alliances allow airlines to improve revenues, reduce costs and increase customer benefits. In recent years, there has been a significant surge in alliance-forming among leading airlines around the world.

Several research projects have studied the effects of alliances on different aspects such as cost reduction, market entry, market share and profitability. Porter and Fuller (1986) argued that alliances enable firms to achieve increased economies of scale through joint operations so that firms can increase profitability. Also, other research has found that alliances enable firms to be more efficient and gain larger market power, resulting in higher profitability gains. Oum et al. (2004) only examined the effect of horizontal alliances on firm performance in terms of productivity and profitability. Based on panel data from 22 airlines from 1986 to 1995, the study revealed that horizontal alliances have a significant contribution to productivity gains and have no significant or positive impact on profitability.

It is important to notice that Oum study only concentrated on Horizontal Alliance. But in reality, there are many types of co-operation of airlines based on different levels of partnership. Therefore, the study about benefits, shortcomings, and comparison of various types of marketing partnerships between airlines will be very useful, especially which strategy is the most advantage to the airline in productivity and profitability. In addition, the 9/11 incident had put on a big change to the airline industry. Thus, this chapter will also touch on the effect of this incident to the airline business both in productivity and profitability.

In this paper, data from leading world airlines was gathered and analyzed to investigate whether each type of airline alliances, in fact, do result in increasing productivity and profitability for the firms involved, by using the Oum et al. model.

This chapter will structure as follow. First part will describe the background of airline alliance and firm productivity and profitability then along with alliance diversity in the market. Next part will describe on research context, methodology and data so as measurement tools of independent, control variables and dependent variables. It is followed by method of analysis and regression results. Last part will be conclusion, limitation and future research.

1. Alliance and firm productivity and profitability

Background

These literatures have suggested that firms can derive various benefits from the formations of strategic alliances (Harrigan, 1986; Porter and Fuller, 1986). According to the resource dependency theory, firms interact with their social environments to secure scarce resources and they often do this by entering strategic alliances as a means to gain access to or acquire such resources. Similarly, the organizational learning theory suggests that alliances can be an important vehicle by which firms learn or transfer knowledge, particularly tactic knowledge, from each other. This knowledge can create a sustainable competitive advantage for firms, sue to its valuable, rare and difficulty to imitate and substitute. In addition, a market power explanation for alliances postulates that alliances can be important tools for strengthening and upgrading strategic position of firms by influencing industry structure evolution, pre-empting competitors, creating synergies, and other strategic moves.

On the other hand, there are costs associated with the formation of strategic alliances. According to the transaction cost theory, firms sometimes form strategic alliances due to diseconomies of market failure. However, since all alliances are based on contracts which partners cannot anticipate and specify all potential future contingencies upon, the airlines may have incentives to exploit each other when an unspecified contingency arises. This potential opportunism, which follows from bounded rationality plus self-interest, can incur various transaction costs, which range from locating and screening partners, to designing contracts, to monitoring the behavior of partners. Besides, firms will also have to bear coordination costs once they decide to enter an alliance (Gulati, singh, 1998). Coordination costs stem from the organizational complexity of decomposing tasks among partners along with ongoing coordination of activities to be completed jointly or individually across organizational boundaries, and the related extent of necessary communication and decisions.

Although strategic alliances can bring firms both potential benefits and potential costs, firm enter alliances believing that potential benefits would outweigh potential costs. Firms can exploit or even enhance alliance benefits such as getting access to resources and transferring knowledge by utilizing appropriate organizational mechanisms. At the same time, firms can contain alliance costs including those of monitoring and coordination with organizational mechanisms and governance structures (Gulati and Singh, 1998)

Alliance and firm productivity

Firm productivity refers to an extent to which a firm produces outputs by using given inputs (Farrell, 1957). Given this definition, a productivity gain can be achieved by reducing inputs, increasing outputs, or both. In fact strategic alliance, are intended to do exactly this-cutting down inputs through resource polling or sharing and joint activities; and increasing outputs through the synergy achieved between partner firms. Through strategic alliances, firms can reduce their inputs by combining and sharing distinct resources and by performing specific activities and projects jointly for increased economics of scale, scope, and learning. At the same time, alliances enable firms to increase outputs through the exploitation of complementary resources that partners lack independently, learn by sharing knowledge, and access to markets.

This argument can be applied to all types of strategic alliances that involve various activities along the value chain, including designing, manufacturing, marketing and sales, Logistics and services. Through co-production or co-distribution, for example, firms can minimize inputs by relying on existing labor and capital (e.g. machinery, equipment, and distribution channels) and simultaneously maximize outputs of products or services, thereby increasing productivity of partner firms. Hence, based on the above arguments, we propose that:

Hypothesis 1: Broader alliance will be positively associated with the productivity of partner firms.

Alliances and firm profitability

As discussed earlier, potential alliance benefits are likely to be greater than potential costs (e.g., Koh and Venkataraman, 1991). Through the use of appropriate organizational mechanisms, benefits can be fully exploited or even be expanded while costs can be contained to a certain extent. According to the literatures, alliance benefits originate from two primary sources (Kogut, 1988), each of which, as Berg et al. (1982) argue, will increase the profitability of firms participating in strategic alliances. First, by entering alliances, firms can achieve cost reduction through increase operational efficiency. This is brought about by improved economies of scale and scope, cost/risk sharing, learning, and access to greater bargaining power over supplier through volume purchases of such items as materials, equipment and parts (Porter, 1980). Cost reduction will be reflected as greater profit margin for given prices. Second, through strategic alliances, firms can also strengthen their competitive position against rivals by increasing market power, introducing new products or services more rapidly, building entry barriers, gaining access to new markets, and taking other strategic actions (Eisenhardt and Schoolnhoven, 1996)

Hypothesis 2: Broader alliances will be positively associated with the profitability of partner firms.

Since the 9/11 hijacking and crashes incident in USA, the airline business has been in a big decline. The study is performed to find out whether and by how much the productivity and profitability of airlines are affected from the incident.

Hypothesis 3: Effects from the 9/11 event will reduce an airline alliance firm's productivity and profitability.

2. Alliance diversity

2.1 Horizontal, vertical and external alliances

In their efforts to improve performance and increase yields, airlines have resorted not only to horizontal, but also to vertical and external alliances. Horizontal alliances are widely defined as alliances between firms selling the same products or services in the market. As airlines tend to ally themselves with partners that have complementary networks, in order to achieve traffic feeds and access to new markets, intra-airline groupings are truly an example of horizontal alliances.

The industry has also had its share of cooperative efforts organized vertically with suppliers, distributors or buyers, as well as of external alliances drawn up with the producers in other industries.

Before looking at airlines involved in such alliance ventures, it should be pointed out that the demands for airline passenger services are derived. Airlines have been under pressure to expand vertically into other areas of the travel industry, such as hotels, travel agencies, car hire or tour organizers, in order to gain greater controls over the ‘total travel product’.

The clearest examples of vertical alliances in the air transport industry are the collaborative arrangements that exist between airlines and hotels, car hire firms, travel agents and other companies involved in travel and tourism, formed in the attempt to provide total travel products and to secure for themselves greater proportions of overall consumer expenditures on travel.

In contrast, very few airlines have been able to integrate vertically with airport authorities. This is because airports are usually public owned and airlines are typically prohibited from holding equity stakes in them by governments, who also tend to veto interests in air traffic control facilities if these are transferred to the private sector.

One form of alliance pact, which merits special mention, is one between airlines and railways, or so-called intermodal alliances. Although, in theory, these should be defined as external, being alliances between two industries which offer substitute services. But, in reality, they have important vertical elements, as the one industry feeds traffic to the other. Intermodal alliances with railways have grown both in Europe and USA, as airlines and rail industries cooperate to provide quick access between airports and city centers. Access to airports through dedicated metro or train lines reduces the problems associated with local road traffic and consequently the deterioration of air quality around airports. It also provides communities living near airports with better access to city center. Nevertheless, alliances involving high-speed trains are a novel feature.

2.2 Marketing and strategic alliances

So far, airline alliances involving equity participation, mergers or marketing co-operation through code sharing or joint operations were mentioned. In practice, a very wide range of complex inter-airline agreements has grown up to meet specific airline needs over the years. Many such agreements pre-dated the period of alliance and were primarily aimed at facilitating the operation or marketing of international air services by airlines that were national in character. Agreements were sometimes purely technical and might involve provision of engineering back-up by two airlines at each other's home base or even joint maintenance for specific aircraft types in their fleets. Many agreements concerned the joint operation of cargo or passenger flights, or the operation by one airline of such services on behalf of two or more partners. One example is a scheduled freighter service between Singapore and London operated jointly by British Airways and Singapore Airlines. The majority of the inter-airline agreements are, however, essentially commercial in character and are primarily involved marketing and selling of passenger and/or cargo services. At the simplest level, it can just be a little more than a prorate agreement which fixes the revenue that one airline will pay the other for carrying the latter's ticketed passengers on a particular part of the former's network. It may also be a more complex agreement for sharing inventories on a particular flight or on several flights with or without block space agreements, whereby one partner purchases an agreed number of seats from the other on the code-shared flights. Airlines may also jointly own computer reservation systems or have joint sales offices or telephone call centers.

Each Airline has, over time, built up a complex web of interlocking agreements with other airlines covering various aspects of its operations and indifferent geographical areas. It would be difficult to argue that all such agreements represent an alliance. Many agreements clearly cut across what appears to be the accepted global alliance groupings. For example, British Airways (BA) in 1998 joined American Airlines (AA) in the Oneworld Alliance but was at that time also in partnership with United Airlines (UA) as major shareholders in Galileo, the computer reservation system (BA subsequently sold its Galileo shares in June 1999). BA handled KLM ground operations at London-Heathrow despite KLM being in a different alliance. Members of BA's Executive Club could earn air miles (frequent flyer points or FFP) on Singapore International Airline (SIA) flights even though the latter belonged to a different FFP group and was linked to the Star Alliance. BA also operated a joint freighter service with SIA. One of BA's earliest domestic franchisees was Loganair (later British Regional). At that time a subsidiary of BA's major domestic competitor, British Midland which was 40% owned by Scandinavian Air System (SAS), which was in alliance with Lufthansa. Conversely, Cathay Pacific, another Oneworld member, in 1999 had a cargo co-operation agreement with Lufthansa. Cathay and SIA, though in different global groupings, are both shareholders in Taeco and maintenance joint venture in China and in a catering joint venture. Although such apparent anomalies abound, it is evident that, gradually over time, the linkages with declared alliance partners will be strengthened and reinforced while those with non-alliance airlines will be replaced or will fade away.

To understand the complexity of inter-airline agreements, one should distinguish between those that are primarily commercial and those that are more strategic. A strategic alliance is one where the partners co-mingle their assets in order to pursue a single or joint set of business objectives. Co-mingled assets may be terminal facilities, maintenance bases, aircraft, staff, traffic rights or capital resources. If two or more airlines offer a common brand and a uniform service standard, they are co-mingling their assets and have moved into a strategic alliance. Many franchise agreements are of this kind. The franchise partners can also have a joint objective to profit from the common passenger traffic generated as a result of the franchise. Thus, despite the fact that one partner may be much smaller than the others, many franchise agreements are truly strategic. Conversely, many code-share agreements, joint FFPs and even some block space agreements are essentially marketing alliances. They are not strategic because the partners continue to operate and use their assets independently, each pursuing their own objectives.

3. Methodology and data

3.1 Research context

I chose to study airlines that belong to alliances for the following reasons. First, facing deregulation, liberalization, and globalization (Makhija et al., 1997) many players in the industry have entered strategic alliances over the past decade to compete more effectively in the increasingly competitive global markets. The successful linkage of alliance partners' networks allow the partners to feed traffic to each other and to pool their traffic so that they can provide more efficient services by using larger aircraft and operate aircraft more intensively. In addition, Alliances reduce costs through joint use of airport facilities and ground staff, joint advertising and promotion, joint purchase of fuel and other items, joint development of system and software, joint handling of baggage transfer, etc. Therefore, the underlying assumption of all firms entering strategic alliances appears to be that they will be able to improve their competitiveness in the market and eventually to achieve a better economic performance through alliances.

Second, this particular industry enables us to measure firm productivity without controlling production technology, which is often difficult for outsiders to observe, since the production process is very similar across firms in the airline industry than it is in most other industries (Caves et al., 1987).

Third, in most industries, comparing the financial statements of firms from different nations is generally difficult due to the differences in accounting practices. However, firm-specific data in the airline industry are comparable across companies from different nations because the International Civil Aviation Organization (ICAO) requires airlines to report various firm data in a standardized format.

3.2 Measurement of independent and control variables

3.2.1 Sample in Empirical Study

In the empirical analysis, I relied on a convenience sample of the world airlines and their alliance partners in terms of passenger-kilometers as published in the ICAO journal Annual Report during the period 1990-2002. The reason for relying on initial sample during this time period was that ICAO ranking only started in 1991. Previous research also indicated that those particular major airlines participated in the majority of airline alliances formed during the study period (Oum, 1997). Secondly and perhaps more importantly, as mentioned in Oum (1997), airlines below the top 30 do not provide a substantial portion of data.

Based on the initial sample companies, I collected data for the study covering the period 1990-2002. The required data for measuring to measure productivity and profitability came primarily from the ICAO publications, including *Traffic, Fleet and Personal, and Financial Data.* I also consulted annual reports of International Air Transport Association publications to supplement the data available from ICAO. In addition, I gathered data from airplane manufacturing company such as Airbus and Boeing, along with each Alliance website.

Airlines' performance is not only affected by the formation of alliances, but also by a large number of other factors. To separate the effects of alliances from the affects of all the other factors, a number of control variables in the empirical investigation, including partner location, firm size, travel distance and business composition, need to be included.

3.2.2 Number of alliance

I measure this variable by the number of existing cooperative agreements for each firm in a given year. The variable was coded as "0" when there was no existing alliance in a given year, "1" when there was one existing alliance in a given year,"2" when there were two existing alliances in a given year, and so on. Number of alliance is counted on all diversity of alliance. No matter if it is a strategic alliance or not.

3.2.3 Control Variables

The potential impact of partner location on firm performance: Since airline industry is a network industry where the geographical location and size are important characteristics of its business, the partner-location variable is calculated from the number of intercontinental alliances divided by the number of total existing alliances for a firm in a given year.

Firm size: Because by virtue of size alone, larger firms may dominate markets and gain competitive advantage which can be measure by total revenues.

Average route distance and takeoff: Because airplanes require substantial fuel consumption, an airline's average cost declines with the average length of the routes on which it flies. This variable is included to control for differences in airlines' network configurations.

Business Composition: To this end, revenues are divided into the proportions of passenger business, mail business, freight business, other business and non-schedule business, and then two variables associated with the last three businesses are included in the panel regressions.

3.3 Measurement of dependent variables-productivity and profitability

Firm productivity can be measured by the ratio of a firm's output to its input (Farrell, 1957). Firms generally use multiple inputs to produce multiple outputs. In such case, a single input productivity (in term of a specific input) would be inappropriate as a measure of a firm's overall productivity since it reflects only how the firm utilizes that specific input, while all other things being constant (Mcgeehan, 1995). Hence, this study used total factor productivity, a ratio of multiple outputs to multiple inputs.

3.3.1 Productivity

Comparisons of productivity over time are often based on index-number procedures. Recent developments in economic theory have improved the knowledge about which index-number procedures are most attractive for productivity comparisons. The distinguishing feature of these new procedures is that they posses many of the properties considered desirable in classical index-number analysis; in addition they represent exactly production structures that have attractive properties. Caves, Christensen and Diewert (1980s) have proposed a procedure for comparing productivities among a cross section of firms or within a combined time series. So I used the methodology that was developed in this paper to provide estimates of the relative levels of total factor productivity (TFP) for 20 airlines during thirteen year period of 1990-2002.

Translog Multilateral Productivity Index

TFP is defined as the amount of aggregate output produced by a unit of aggregate input. Caves, Christensen and Diewert (CCD, 1982) proposed the following well-known multilateral index procedure for computing TFP and making comparisons across firms, and over time:

Translog Multilateral Output Index

$$\ln\frac{Xi}{Xj}=\sum\frac{Wki+\overline{Wk}}{2}\ln\frac{Xki}{\widetilde{\overline{Xk}}}-\sum\frac{Xkj+\overline{Xk}}{2}\ln\frac{Xkj}{\widetilde{\overline{Xk}}}$$

Xi is the proportion of aggregate index of output for i observation over j observation

Wki is the revenue of k output for i observation

$\overline{Wk}$ is the weight (arithmetic mean of revenue k for all observation)

Xki is the k output for i observation

Xkj is the k output for the j observation

$\overline{Xk}$ is the weight (arithmetic mean of output k for all observation)

$\widetilde{Xk}$ is the weight (geometric mean of k output for all observation)

In aggregating outputs, revenue shares are use as weights. Consequently, higher weights were given to outputs with higher yields.

Translog Multilateral Input Index

$$\ln\frac{Yi}{Yj} = \sum\frac{Wki + \overline{Wk}}{2}\ln\frac{Yki}{\widetilde{Yk}} - \sum\frac{Ykj + \overline{Yk}}{2}\ln\frac{Ykj}{\widetilde{Yk}}$$

$\frac{Yi}{Yj}$ is the proportion of aggregate index of input for i observation over j observation

Wki is the cost of k input for i observation

$\overline{Wk}$ is the weight (arithmetic mean of cost k for all observation)

Yki is the k output for i observation

Ykj is the k output for the j observation

$\overline{Yk}$ is the weight (arithmetic mean of output k for all observation)

$\widetilde{Yk}$ is the weight (geometric mean of k output for all observation)

In aggregating inputs, cost shares are use as weights. More expensive input factors were given higher weights when aggregating inputs.

Translog Multilateral Productivity Comparison

$$Y = \ln\frac{Xi}{Xj} - \ln\frac{Yi}{Yj}$$

$$= \left(\sum\frac{Wki+\overline{Wk}}{2}\ln\frac{Xki}{\widetilde{Xk}} - \sum\frac{Xkj+\overline{Xk}}{2}\ln\frac{Xkj}{\widetilde{Xk}}\right) - \left(\sum\frac{Wki+\overline{Wk}}{2}\ln\frac{Yki}{\widetilde{Yk}} - \sum\frac{Ykj+\overline{Yk}}{2}\ln\frac{Ykj}{\widetilde{Yk}}\right)$$

Y is the proportion of aggregate index of productivity for ith observation over j observation.

3.3.2 Profitability

I also measured the profitability index by dividing total revenues (TR) by total input cost (TIC). I initially developed a measure of profitability, (TR-TIC)/TR, based on the formula for return to scales. It was then transformed into TR-TIC, since the log-linear specification required variables to be positive. For several sample airlines in certain year, the (TR-TIC)/TR values were negative, making it unable to estimate. The reason I use TR/TIC as a proxy for profitability measure was because data on profitability, such as return on assets and return on sales, were not available for some of the sample firms during parts of the study period.

3.4 Data

Measurement of productivity and profitability require detailed data on outputs, inputs, network and operational attributes. This section describes the sources of the data set and the methods used for constructing output and input variables.

I distinguished five categories of airline revenue/outputs and five categories of airline cost/inputs;

3.4.1 Airlines Revenue

Scheduled passenger service: The main part of airline's revenue from Passenger service in the schedule, which is calculated by the sum of ticket revenue not including the discount. This data is obtained from ICAO's Financial Data.

Scheduled Freight Service: The sum of cargo service revenue on scheduled flight each period. This data is obtained from ICAO's Financial Data

Mail Service: The sum of mail service revenue on schedule flight each period. This data is also from ICAO's Financial Data.

Non-Scheduled Service: The sum of all revenue from non-scheduled operate service, which cannot be separate into each categories of passenger, cargo or mail. This data is also obtained from ICAO's Financial Data.

Other services (also called “incidental): Services in the airline industry including a wide variety of other businesses such as catering services, ground handling, aircraft maintenance, and reservation services for other airlines, sales of technology, consulting services, and hotel business. This data is also obtained from ICAO’s Financial Data.

3.4.2 Airline Output Quantity

Scheduled passenger service (Measured in revenue passenger kilometers or RPK): The sum of total distance that passenger has flown. This is calculated from number of passengers multiplied by stage length. This data is from ICAO’s traffic data.

Scheduled Freight Service (Measure in revenue ton kilometers or RTK): The sum of the stage length that airline carry one ton of cargo. This is calculated from cargo’s weight (ton) multiplied stage length. This data is from ICAO’s traffic data.

Mail Service (Measure in revenue ton kilometers or RTK): The sum of the stage length that airlines carry one ton of mail. This is calculated from mail’s weight (ton) multiplied by stage length. This data is also from ICAO’s Traffic Data.

Non-Scheduled Service (Measure in revenue kilometers): this category can be calculated from total weight (ton) multiplied by stage length. This data is also opted from ICAO’s Traffic Data.

Other services (or called “incidental” services in the airline industry): This index is computed by deflating the incidental revenues, from ICAO’s financial data, with appropriate price index. Since the incidental services include a wide variety of activities, it is very difficult to construct an exact incidental price index for each individual firm. Furthermore, if the sample firms are based in different countries, the incidental price index will have to be adjusted to real price levels of home countries. To reflect this, each country's Consumer Index was used.

3.4.3 Airline Expenditure

Labor expense: Including Captain, First Officer, Flight Engineering, Steward/Stewardess, Maintenance and overhaul personnel, Ticketing and sales personnel and all other personnel's salary, bonus and all benefits cost. This data is from ICAO's Fleet and Personnel Data.

Fuel and oil expense: This is the cost of fuel used by aircrafts. The data is from Financial Data.

Flight Expense: The expense from fleet which include flight equipment insurance, rental of flight equipment, flight equipment maintenance and also depreciation of flight equipment. This is from Financial Data.

Ground Property Expense: The expense from land and building which usually is the sunk cost from the beginning years. But in this paper, the per-year depreciation of property is used, which listed in ICAO's Financial Data.

Other Materials Expense: All other inputs, not included in any of the input categories mentioned above. The material cost covers numerous items, such as airport fees, sales commissions, passenger meals, employees travel, consultants, non labor repair and maintenance expenses, stationary and other purchased goods and services. Materials cost is computed by subtracting labor, fuel, and capital related expenses from the total operating cost reported in the ICAO's Financial Data.

3.4.4 Airline Input Quantity

Labor: measured by total number of employees. Data is obtained from Fleet and Personnel Data.

Fuel: measured by gallons of fuel consumed. This data is not listed in any of the report. So I calculated by each airline's fleet multiplied by average usage of fuel (gallon) per hour. The average usage of fuel on each aircraft is from manufacturer's website, such as Airbus or Boeing, and fleet flown each hour of each airline is from ICAO's Fleet and Personnel Data.

Flight equipment: Since small size fleet and large size fleet do not have the same productivity, using total number of aircraft is not proper. Therefore, a fleet quantity index is constructed by capacity of each airplane multiplied by number of each airplane in each airline. Because airlines earn most revenue from passenger, I use the seat available in each airline.

Ground Property: ground property index can be calculated by ground property expense of each airline divided by consumer price index of the airline origin country. Ground property expense is obtained from ICAO's financial data.

Materials input contains all other inputs that are not already included in any of the input categories mentioned above. Materials cost includes numerous items such as airport fees, sales commissions, passenger meals, employees travel, consultants, non labor repair and maintenance expenses, stationary and other purchased goods and services. Materials cost was computed by subtracting labor, fuel, and capital related expenses from the total operating cost reported in the ICAO's financial data. Similar to the case of incidental output, the materials quantity index was computed by dividing the materials cost by consumer price index of each country that airline originate from.

4. Method of Analysis

This paper uses balanced panel data of 20 airlines during 15 years period (n=300), which was analyzed. A panel regression model was employed to test out two hypotheses. As suggested by Hausman (1978), parameters were estimated using the "within estimator" and the "generalized least squares estimator" (GLS), which is also known as the fixed effects estimator or the random-effects estimator, respectively. The model was specified as follows:

$$Y_{it} = \alpha_{it} + \gamma ALY_{it} + \sum \omega_{jt} X_{jt} + \varepsilon_{it}$$

Where Y_{it} is the dependent variable for firm i and year t

α is the effect of firm i

γ is the effect of the number of alliances (ALY)

ω is the within-firm slope for control variable Xj

ε_{it} is a normally distributed error term.

The coefficient of ALY portrayed the change in allied firm performance in comparison to non-allied firm performance. All variables except dummy variables were transformed into logarithmic form to facilitate the interpretation.

5. Regression results

5.1 Test results of hypotheses 1, effect of alliance on firm productivity and profitability

From Table 4.1, Model 1 included all control variables except alliance-related variables, which were firm size, route distance, proportion of freight business, proportion of mail, proportion of non-scheduled flights, and proportion of other business. This model was used as a baseline to compare the results with an alliance-related model and a model with time lag. Table 1 showed the effect of strategic alliances on firm productivity (adj. $R2=0.871$, $F=48.281$, $P<0.01$). It also showed that firm size had a significant negative effect at 5% level and also negative significance at 1% for proportion of other business. In case of marketing alliances (adj. $R2=0.902$, $F=49.982$, $P<0.05$), the result was similar to strategic alliances in that firm size and proportion of other business were negative at 10% and 1% levels of significance. The result of complimentary alliances (adj. $R2=0.905$, $F=46.754$, $P<0.05$) was different from the first two types in that it had no significance on both the firm size and proportion of other business. For the parallel alliances (adj.$R2=0.756$, $F=45.502$, $P<0.05$), the results were similar to strategic and marketing alliances, but only the proportion of business exhibited a negative impact on productivity.

Model 2 provided evidence of a positive impact of alliances on productivity after the effects of alliance-related control variables and all other control variables were included. For strategic alliances (adj. $R2=0.881$, $F=49.404$, $P<0.01$), the number of alliances had an estimated coefficient of 0.023 and was significant at the 1% level. After all alliance related control variables were included, airlines gained productivity at a rate of 2.3%. This model also showed that the proportion of other business had a positive significant effect on airline alliances. However, firm size does have a negative significance to productivity, while the proportion of other business had positive significance in marketing alliance (adj. $R2=0.912$, $F=51.145$, $P<0.05$). While complimentary alliances (adj. $R2=0.915$, $F=47.814$, $P<0.05$) did not exhibit significance to productivity of firm, and parallel alliances (adj. $R2=0.765$, $F=46.562$, $P<0.05$) were significant on productivity. It can be concluded that if airlines had more alliances, productivity of each airline would increase at a rate of 2.1% and 0.5% respectively.

Model 3 contains all the variables of the study including the two lag variables for the number of alliances. The result shows that the coefficient for number of alliances was estimated as 0.019 for strategic alliance and was significant at 5% level, where as the lag viable was estimated as insignificant. But for marketing alliance, coefficient for number of alliances is estimated at 0.006 and insignificant. But in case of horizontal alliance after putting in time lag, coefficient for number of alliances was at 0.008 and significant at 3.543 while vertical alliance coefficient for number of alliances was not significant. Each alliance on average enhanced partner firm productivity by about 1.3%, whereas there was no significant lag effect on productivity gains.

A profitability test for model 1 was carried out similar to the productivity test. This model was used as a baseline, where all control variables without two alliance-related control variables were included. In table 2, the effect of strategic alliances (adj. $R2=0.680$, $F=23.692$, $P<0.05$) showed that the proportion of other business had a negative significance on airline profitability. In the case of marketing alliances (adj. $R2=0.704$, $F=44.174$, $P<0.05$), the proportion of other business had a negative impact on airline profitability. Unfortunately, complimentary alliance results (adj. $R2=0.707$, F=34.112, P<0.05) showed that none of the control variables were significant with profitability. Lastly, the effect of parallel alliances (adj. R2=0.876, F=32.857, P<0.05) was similar to the complimentary alliances, where none of the control variables had any significant effect on profitability.

Model 2 incorporated the main variable, the number of alliances and alliance-related control variable, together with model 1. The results from table 2 (adj. R2=0.680, F=22.707, P<0.05) revealed that the coefficient for number of alliances was 0.006 at 10% significance level. This implies that an increase in airlines of alliances could have a positive significant impact on profitability gains by an average of about 0.6%. Also, route distance had 10.9% coefficient increasing of airlines' profitability. However, proportion of other business exhibits the significant effect only 10% on airlines' profitability. Marketing alliances, (adj. R2=0.704, F=43.155, P<0.05) showed that the coefficient of alliance was 0.014 at 10% significance level. It also implied that the number of alliances could increase profitability by 1.4%. This model also showed that route distance had a positive significance, which means a longer distance could result in more profitability.

Nevertheless, a greater proportion of other business resulted in a profitability decrease. A positive significance on profitability also occurred in parallel alliances (adj. R2=0.876, F=31.927, P<0.05) at coefficient 0.006, where route distance had a positive impact on profitability. The only type of alliance that did not show significance to profitability is complimentary alliance (adj. R2=0.707, F=33.183, P<0.05).

However, when I incorporated lag variables for the number of alliances into empirical model, I found no evidence of a positive effect on profitability as shown in model 3 for all four categories.

5.2 Test results for Hypotheses 3, effects of alliances on firm productivity and profitability before and after 9/11

In this analysis, only model 2 in Hypothesis 1 and 2 is displayed in the table. Results from model 2 provided evidence of positive impact of alliances on productivity and profitability, where the effects of alliance-related control variables and all other control variables were included. In this test, a time period of before 9/11 was defined as 1990 to August 2001, while after 9/11 was defined as September 2001 to 2004.

The effect of alliances on productivity is displayed in table 3. It showed that an alliance effect on airlines productivity decreased after 9/11. Strategic alliances decreased from 3.4% to 1.8%, complimentary alliances were reduced from 2.3% to 1.5%, and parallel alliance declined from 2.3% to 2.0%. Marketing alliance did not have significant results but also were shown to be decreasing. Table 4 exhibits the effects of alliances on profitability before and after 9/11. The effects of alliances on airline profitability decreased after 9/11 in comparison to earlier periods as well. Here, complimentary alliances did not show any significant effect on the regression. However, strategic alliance, marketing alliance, and parallel alliance results showed that increasing in the number of members of an alliance increased profitability at the rates of 0.4%, 1.4%, and 0.7% , respectively before 9/11, whereas the rate dropped to 0.1%, 0.8% and 0.1%, respectively, after 9/11.

6. Conclusion, limitation and future research

This paper applies the Hausman test to find the correlation of airlines participating in alliances to productivity and profitability of 20 major airlines. Controlling firm size, distance and composition of business, the regression results prove that a fixed effect model yields better results than a random effect model. It also reveals that route distance has no relationship with airline productivity, while the proportion of other associate business has a positive effect. Moreover, participating in alliances has a positive effect on airline productivity. Complimentary alliances tend to yield the most positive effects, followed by strategic alliances and parallel alliances, while marketing alliances seem to have no effect.

On profitability, airline alliances resulted in a positive effect on profitability, except with complimentary alliances. Unlike productivity, profitability is positively significant with the route distance: this implies that a longer route could result in less cost to the airlines, which was also proved by Oum et al (1995). A marketing alliance is revealed to be the most effective alliance, gaining more profitability than complimentary, strategic and parallel alliances. Airlines need to compete in the same market to generate more profit.

The analysis also shows that after the events of 9/11, the productivity and profitability indexes of airlines have greatly declined. However, based on the correlation of alliance to productivity and profitability, joining alliances could help airlines lessen the problem.

The implication of this study is to demonstrate the positive impact of alliances on productivity and profitability since past studies have found that profitability is not an issue. This study also shows that to obtain better productivity, airlines need to enter into more strategic alliances. Ultimately, this study shows the effects of 9/11 on airline alliance strategy where the issue is very interesting.

Nevertheless, this research suffered from limitations of data availability. The results might not represent the entire industry due to the small sample size. Due to the fact that productivity and profitability could be affected by various factors, this study could not conclude whether the benefits of an alliance were actually derived from cost reduction or revenue increase. In regards to the number of alliances, a number of airlines cooperating in alliances each year were studied, which may cause a time-trend in productivity. Additionally, even by using ICAO data where cost of airplanes was treated as capital stock, it was difficult to separate capital investment from costs for the study. In the future, the VFP method can be applied to further improve the study.

Table 3.1 Descriptive statistic and correlations

	variables	Means	S.D.	Correlation								
				1	2	3	4	5	6	7	8	9
1	Productivity	1.411	0.583	1								
2	Profitability	0.046	0.051	0.012	1							
3	Alliance	1.028	0.525	0.44	-0.111	1						
4	Partner Location	1.5	3.261	0.101	0.295	-0.111	1					
5	Firm size (log)	10.159	0.676	-0.021	0.29	-0.384	0.18	1				
6	Travel Distance (log)	7.651	0.514	0.602	0.123	-0.656	0.187	0.153	1			
7	Proportion of freight	9.451	7.037	0.68	0.081	-0.33	0.013	-0.335	0.448	1		
8	Proportion of nonsched	0.584	0.869	0.087	-0.222	-0.118	-0.205	-0.225	0.097	0.285	1	
9	Proportion of other	7.402	5.109	-0.134	0.071	-0.021	-0.042	-0.001	-0.205	-0.009	0.051	1

Table 3.2 Effect of strategic alliances on firm productivity

Type of Alliance	Strategic Alliance		
Variables	Dependent Variable Productivity (in log)		
	Model 1	Model 2	Model 3
Intercept	-0.507 (-0.447)	0.271 (0.207)	0.264 (0.349)
Number of Alliances		0.023 *** (3.75)	0.019 ** (2.31)
One-Year lag for number of alliance			0.007 (0.222)
Two-Year lag for number of alliance			0.002 (0.875)
Firm Size	-0.049 ** (-2.625)	-0.046 *** (-3.312)	-0.030 ** (-2.417)
Route Distance	0.033 (1.525)	0.032 (0.424)	0.018 (0.383)
Proportion Of Fright	0.049 (0.882)	0.059 (0.041)	0.044 (0.080)
Proportion Of Other Business	-0.072 *** (-4.216)	0.042 (5.481)	0.038 *** (3.455)
Proportion of Non-schedule	0.007 (1.269)	0.004 (0.122)	0.008 (0.476)
1990			0.024 (1.043)
1991			0.053 * (1.926)
1992			0.059 * (1.813)
1993			0.036 (1.000)
1994			0.038 (0.211)
1995			0.045 (1.073)
1996			0.077 (1.215)
1997			0.092 * (1.675)
1998			0.103 * (1.895)
1999			0.116 * (1.937)

Type of Alliance	Strategic Alliance		
Variables	**Dependent Variable Productivity (in log)**		
	Model 1	**Model 2**	**Model 3**
2000			0.120 ** (2.013)
2001			0.127 ** (2.139)
2002			0.134 ** (2.315)
2003			0.133 ** (2.216)
2004			0.140 *** (3.214)
Adjusted R2	0.871	0.881	0.912
Hausman Stat	20.316 **	20.452 **	20.513 **
F Statistic	48.281 ***	49.404 ***	51.157 ***
Log (likelihood)	538.271	612.021	633.733

(* significant at 10%, ** significant at 5%, *** significant at 1%)

Table 3.3 Effect of marketing alliances on firm productivity

Type of Alliance	Marketing Alliance		
Variables	Dependent Variable Productivity (in log)		
	Model 1	Model 2	Model 3
Intercept	0.837 (0.274)	0.892 (0.547)	0.912 (0.337)
Number of Alliances		0.008 (1.12)	0.006 (2.004)
One-Year lag for number of alliance			0.007 (0.008)
Two-Year lag for number of alliance			0.002 (0.009)
Firm Size	-0.051 * (-2.396)	-0.048 *** (-3.413)	-0.030 * (-2.148)
Route Distance	0.034 (1.572)	0.033 (0.437)	0.024 (1.761)
Proportion Of Fright	0.05 (0.909)	0.006 (0.042)	0.004 (0.109)
Proportion Of Other Business	-0.074 *** (-4.345)	0.063 *** (5.648)	0.062 ** (2.941)
Proportion of Non-schedule	0.048 (0.174)	0.044 (0.126)	0.046 (0.123)
1990			0.028 (1.124)
1991			0.054 (1.128)
1992			0.066 (1.133)
1993			0.048 (1.137)
1994			0.034 (1.140)
1995			0.076 (1.143)
1996			0.084 (1.150)
1997			0.093 * (1.987)
1998			0.112 ** (2.361)
1999			0.146 ** (2.346)
2000			0.124 *

Type of Alliance	Marketing Alliance		
Variables	Dependent Variable Productivity (in log)		
	Model 1	Model 2	Model 3
			(1.932)
2001			0.125 (1.245)
2002			0.125 (1.476)
2003			0.132 (1.543)
2004			0.142 * (1.793)
Adjusted R2	0.902	0.912	0.894
Hausman Stat	12.142 *	12.158 *	12.214
F Statistic	49.982 **	51.145 **	50.047 **
Log (likelihood)	603.822	633.585	637.425

(* significant at 10%, ** significant at 5%, *** significant at 1%)

Table 3.4 Effect of horizontal alliances on firm productivity

Type of Alliance	Horizontal Alliance		
Variables	Dependent Variable Productivity (in log)		
	Model 1	Model 2	Model 3
Intercept	-0.376 (-0.300)	0.101 (0.357)	0.183 (0.308)
Number of Alliances		0.005 *** (3.863)	0.008 *** (3.546)
One-Year lag for number of alliance			0.004 ** (2.864)
Two-Year lag for number of alliance			0.002 (1.794)
Firm Size	-0.096 (-0.765)	-0.094 (-0.800)	-0.092 (-0.774)
Route Distance	-0.045 (-1.751)	-0.046 (-0.105)	-0.38 (-0.947)
Proportion Of Fright	-0.11 (-0.901)	-0.064 (-0.105)	-0.094 (-0.840)
Proportion Of Other Business	-0.036 ** (-2.647)	-0.029 *** (-3.422)	-0.033 ** (-2.841)
Proportion of Non-schedule	-0.037 (-0.843)	-0.063 (-0141)	-0.053 (-0.954)
1990			0.021 (1.043)
1991			0.026 (1.926)
1992			0.034 (0.943)
1993			0.038 (1.121)
1994			0.042 (0.944)
1995			0.041 (0.976)
1996			0.043 (1.021)
1997			0.054 (1.322)
1998			0.065 (1.423)
1999			0.073 * (1.848)
2000			0.096 **

Type of Alliance	Horizontal Alliance		
Variables	Dependent Variable Productivity (in log)		
	Model 1	Model 2	Model 3
			(1.932)
2001			0.084 (1.212)
2002			0.065 * (1.246)
2003			0.070 * (1.734)
2004			0.075 ** (1.946)
Adjusted R2	0.756	0.765	0.814
Hausman Stat	23.12 **	23.468 ***	24.01 **
F Statistic	45.502 **	46.562 **	45.528 **
Log (likelihood)	550.434	557.569	578.927

(* significant at 10%, ** significant at 5%, *** significant at 1%)

Table 3.5 Effect of vertical alliances on firm productivity

Type of Alliance	Vertical Alliance		
Variables	Dependent Variable Productivity (in log)		
	Model 1	Model 2	Model 3
Intercept	0.881 (0.957)	1.358 (0.9)	0.300 (0.337)
Number of Alliances		0.021 *** (3.75)	0.019 (2.375)
One-Year lag for number of alliance			0.002 (0.222)
Two-Year lag for number of alliance			0.007 (0.875)
Firm Size	1.161 (0.492)	1.163 (0.458)	-1.094 (-1.500)
Route Distance	1.212 (0.494)	1.211 (0.458)	1.118 (0.543)
Proportion Of Fright	1.147 (0.356)	1.193 (1.152)	1.043 (1.942)
Proportion Of Other Business	1.221 (1.39)	1.228 (2.164)	1.213 (1.741)
Proportion of Non-schedule	1.22 (0.414)	1.194 (1.116)	1.247 (0.984)
1990			0.029 (1.167)
1991			0.053 * (1.929)
1992			0.065 ** (2.003)
1993			0.049 (1.297)
1994			0.034 (0.85)
1995			0.077 * (1.767)
1996			0.119 * (1.859)
1997			0.124 ** (2.003)
1998			0.137 *** (2.622)
1999			0.151 *** (3.140)

Type of Alliance	Vertical Alliance		
Variables	**Dependent Variable Productivity (in log)**		
	Model 1	**Model 2**	**Model 3**
2000			0.171 *** (3.245)
2001			0.170 *** (3.326)
2002			0.195 *** (3.509)
2003			0.197 *** (3.476)
2004			0.194 *** (3.314)
Adjusted R2	0.905	0.915	0.908
Hausman Stat	18.241 **	18.523 **	18.432 **
F Statistic	46.754	47.814 **	48.528 ***
Log (likelihood)	551.623	578.755	584.236

(* significant at 10%, ** significant at 5%, *** significant at 1%)

Table 3.6 Effects of strategic alliances on firm profitability

Type of Alliance	Strategic Alliance		
Variables	Dependent Variable : Profitability (in log)		
	Model 1	Model 2	Model 3
Intercept	0.262 (1.515)	0.593 (1.964)	0.495 (1.105)
Number of Alliances		0.006 * (2.465)	0.007 ** (2.000)
One-Year lag for number of alliance			0.005 (1.347)
Two-Year lag for number of alliance			0.008 (1.239)
Firm Size	0.027 (1.164)	0.019 (1.765)	0.014 (1.583)
Route Distance	0.086 (1.754)	0.109 ** (2.845)	0.123 ** (2.607)
Proportion Of Fright Business	-0.02 (-1.710)	-0.017 (-1.167)	-0.022 (-1.710)
Proportion Of Other Business	-0.032 *** (-3.092)	-0.008 * (-2.429)	-0.014 (2.206)
Proportion of Non-schedule	0.007 (-1.037)	0.001 (-1.035)	0.005 (1.167)
1990			0.039 ** (2.533)
1991			0.043 ** (2.471)
1992			0.020 (1.000)
1993			-0.040 * (-1.696)
1994			-0.015 (-1.625)
1995			-0.017 (-1.654)
1996			-0.019 (-1.704)
1997			-0.008 (-1.267)
1998			-0.002 (-1.102)
1999			0.01 1.033
2000			0.002 (1.102)

Type of Alliance	Strategic Alliance		
Variables	**Dependent Variable : Profitability (in log)**		
	Model 1	**Model 2**	**Model 3**
2001			0.006 (1.135)
2002			0.012 (1.897)
2003			0.008 (1.976)
2004			0.010 * 2.143
Adjusted R2	0.68	0.68	0.70
Hausman Stat	21.428 **	21.395 **	21.416 **
F Statistic	23.692 **	22.707 **	23.148 **
Log (likelihood)	822.915	830.501	831.614

(* significant at 10%, ** significant at 5%, *** significant at 1%)

Table 3.7 Effects of marketing alliances on firm profitability

Type of Alliance	Marketing Alliance		
Variables	Dependent Variable : Profitability (in log)		
	Model 1	Model 2	Model 3
Intercept	0.432 (1.895)	0.475 (1.762)	0.405 (1.115)
Number of Alliances		0.014 * (1.965)	0.013 * (2.746)
One-Year lag for number of alliance			0.002 (1.333)
Two-Year lag for number of alliance			0.001 (1.214)
Firm Size	0.028 (1.2)	0.019 (0.789)	0.20 (1.756)
Route Distance	0.088 (1.808)	0.112 ** (2.932)	0.104 ** (2.345)
Proportion Of Fright Business	-0.021 (-1.732)	-0.018 (-1.172)	-0.016 (-1.546)
Proportion Of Other Business	-0.033 *** (-3.187)	-0.008 * (-2.503)	-0.021* (-1.087)
Proportion of Non-schedule	0.007 (1.038)	-0.001 (-1.036)	0.006 (1.047)
1990			0.036 ** (2.500)
1991			0.040 ** (2.344)
1992			-0.015 (-1.789)
1993			-0.022 (-1.348)
1994			-0.011 (-1.547)
1995			-0.001 * (-1.876)
1996			-0.004 * (-1.923)
1997			-0.001 * (-1.746)
1998			0.013 (1.234)
1999			0.016 (1.356)
2000			0.020 (1.172)

Type of Alliance	Marketing Alliance		
Variables	Dependent Variable : Profitability (in log)		
	Model 1	Model 2	Model 3
2001			0.018 * (1.762)
2002			0.007 * (1.874)
2003			0.006 * (1.932)
2004			0.010 * (2.013)
Adjusted R2	0.704	0.704	0.721
Hausman Stat	14.234 **	14.584 **	14.381 **
F Statistic	44.174 **	43.155 **	43.597 **
Log (likelihood)	851.909	859.763	860.521

(* significant at 10%, ** significant at 5%, *** significant at 1%)

Table 3.8 Effects of horizontal alliances on firm profitability

Type of Alliance	Horizontal Alliance		
Variables	Dependent Variable : Profitability (in log)		
	Model 1	Model 2	Model 3
Intercept	0.095 (0.532)	0.298 (1.112)	0.385 (1.585)
Number of Alliances		0.006 ** (2.685)	0.005** (2.128)
One-Year lag for number of alliance		0.004 (1.136)	0.004 (1.136)
Two-Year lag for number of alliance		0.002 (1.544)	0.002 (1.594)
Firm Size	-0.049 (-1.785)	-0.054 (-1.618)	0.128 (1.193)
Route Distance	-0.013 (-1.993)	0.003 * (2.534)	0.087** (2.137)
Proportion Of Fright	-0.086 (-1.738)	-0.071 (-1.224)	0.77 (1.458)
Proportion Of Other Business	-0.078 (-1.959)	-0.076 (-1.553)	-0.056 (-1.348)
Proportion of Non-schedule	-0.061 (-1.089)	-0.067 (-1.088)	1.878 (1.597)
1990			0.038 (1.347)
1991			0.042 * (1.984)
1992			0.120 (1.566)
1993			-0.039 (-1.344)
1994			-0.015 * (-1.761)
1995			-0.017 * (-1.843)
1996			-0.019 (-1.231)
1997			-0.008 (-1.314)
1998			0.003 (1.522)
1999			0.009 (1.249)
2000			0.011 (1.132)

Type of Alliance	Horizontal Alliance		
Variables	Dependent Variable : Profitability (in log)		
	Model 1	Model 2	Model 3
2001			0.014 * (1.947)
2002			0.008 * (1.996)
2003			0.009 ** (2.345)
2004			0.010 ** (2.413)
Adjusted R2	0.876	0.876	0.854
Hausman Stat	19.429 **	19.893 **	20.002 *
F Statistic	32.857 **	31.927 **	31.748 **
Log (likelihood)	776.614	783.773	785.411

(* significant at 10%, ** significant at 5%, *** significant at 1%)

Table 3.9 Effects of vertical alliances on firm profitability

Type of Alliance	Vertical Alliance		
Variables	**Dependent Variable : Profitability (in log)**		
	Model 1	**Model 2**	**Model 3**
Intercept	1.352 (1.725)	1.554 (1.145)	1.377 (1.492)
Number of Alliances		0.006 (1.275)	0.013 (1.124)
One-Year lag for number of alliance			0.007 (1.235)
Two-Year lag for number of alliance			0.010 (1.495)
Firm Size	1.208 (1.472)	1.203 (1.639)	1.196 (1.842)
Route Distance	1.244 (1.736)	1.258 (1.276)	1.264 (1.965)
Proportion Of Fright	1.171 (1.519)	1.186 (1.033)	1.192 (1.234)
Proportion Of Other Business	1.179 (1.702)	1.181 (1.296)	1.246 (1.895)
Proportion of Non-schedule	1.196 (1.168)	1.19 (1.169)	1.21 (1.347)
1990			0.024 (0.023)
1991			0.052 (1.465)
1992			0.057 (1.549)
1993			0.034 (1.247)
1994			-0.008 (-1.611)
1995			-0.006 (-1.559)
1996			-0.009 * (-1.998)
1997			-0.003 * (-2.002)
1998			0.001 (1.532)
1999			0.006 (1.641)
2000			0.010 (1.542)

Type of Alliance	Vertical Alliance		
Variables	Dependent Variable : Profitability (in log)		
	Model 1	Model 2	Model 3
2001			0.018 * (2.004)
2002			0.015 * (1.986)
2003			0.012 ** (2.473)
2004			0.014 * (2.104)
Adjusted R2	0.707	0.707	0.812
Hausman Stat	20.142 **	20.354 **	20.256 **
F Statistic	34.112 **	33.183 **	34.007 **
Log (likelihood)	777.776	784.934	790.216

(* significant at 10%, ** significant at 5%, *** significant at 1%)

Table 3.10 Effects of alliances on productivity before and after 9/11

Type of Alliance	**Strategic Alliance**		**Marketing Alliance**		**Complimentary Alliance**		**Parallel Alliance**	
Variables	**Dependent Variable: Productivity (in log)**		**Dependent Variable: Productivity (in log)**		**Dependent Variable: Productivity (in log)**		**Dependent Variable: Productivity (in log)**	
	Before	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**
Intercept	-0.484 (-0.424)	0.263 (0.201)	0.841 (0.270)	0.896 (0.296)	0.875 (0.952)	1.350 (0.895)	-0.374 (-0.299)	0.105 (0.155)
Number of Alliances	0.034*** (3.564)	0.018*** (3.636)	0.006 (1.342)	0.004 (1.452)	0.023*** (3.562)	0.015*** (3.729)	0.023 *** (3.562)	0.020*** (3.452)
Firm Size	-0.027* (-2.599)	-0.045*** (-3.211)	-0.047 (-2.390)	0.076 (2.434)	1.154 (0.490)	1.156 (0.456)	-0.096 (-0.761)	0.041 (0.485)
Route Distance	0.055 (1.501)	0.031 (0.411)	0.038 (1.567)	0.136 (0.214)	1.205 (0.492)	1.204 (0.735)	-0.045 (-1.741)	0.077 (0.275)
Proportion of Freight Business	0.071 (0.859)	0.057 (0.040)	0.054 (0.904)	0.157 (0.080)	1.140 (0.354)	1.186 (1.146)	-0.110 (-0.896)	0.064 (0.033)
Proportion of Other Business	0.005*** (4.188)	0.002*** (5.314)	-0.070*** (-4.338)	0.113*** (4.100)	1.213 (2.382)	1.220 (2.152)	-0.036* (-2.632)	0.090* (2.440)

Type of Alliance	Strategic Alliance		Marketing Alliance		Complimentary Alliance		Parallel Alliance	
Variables	Dependent Variable: Productivity (in log)		Dependent Variable: Productivity (in log)		Dependent Variable: Productivity (in log)		Dependent Variable: Productivity (in log)	
	Before	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**
Proportion of Non-scheduled	0.069 (1.245)	0.004 (0.118)	0.052 (0.170)	0.114 (0.017)	1.212 (0.412)	1.187 (1.110)	-0.037 (-0.839)	0.064 (0.006)
Adjusted R2	0.892	0.854	0.906	0.792	0.899	0.909	0.751	0.682
Hausman Stat	20.310**	19.829**	12.138**	9.178**	18.134**	18.415**	22.992***	17.612***
F Statistic	48.237**	47.899**	49.954***	38.251***	46.481**	47.535**	45.236***	34.833**:
2 log (likelihood)	582.495	593.371	603.432	472.583	548.407	575.380	547.225	430.812

(* significant at 10%, ** significant at 5%, *** significant at 1%)

Table 3.11 Effects of airline alliances on profitability before and after 9/11

Type of Alliance	Strategic Alliance		Marketing Alliance		Complimentary Alliance		Parallel Alliance	
Variables	Dependent Variable: Profitability (in log)		Dependent Variable: Profitability (in log)		Dependent Variable: Profitability (in log)		Dependent Variable: Profitability (in log)	
	Before	After	Before	After	Before	After	Before	After
Intercept	0.354 (0.425)	0.376 (0.523)	0.477 (0.766)	0.458 (0.749)	1.313 (0.713)	1.510 (0.147)	0.087 (0.525)	0.285 (1.091)
Number of Alliances	0.004* (2.532)	0.001** (2.893)	0.014** (2.976)	0.008** (2.923)	0.007 (1.294)	0.002 (1.274)	0.007** (2.894)	0.001** (2.825)
Firm Size	0.027 (2.109)	0.019 (2.353)	0.019 (1.307)	0.013 (1.274)	1.173 (0.466)	1.168 (0.629)	-0.054 (-0.772)	-0.058 (-0.609)
Route Distance	0.087** (2.777)	0.110** (2.882)	0.112** (2.948)	0.104** (2.866)	1.208 (0.724)	1.222 (1.251)	-0.018 (-1.950)	-0.003* (-2.478)
Proportion of Freight Business	-0.015 (-0.720)	-0.018 (-0.170)	-0.019 (-0.173)	-0.023 (-0.174)	1.137 (0.512)	1.151 (1.014)	-0.090 (-0.726)	-0.075 (-0.224)
Proportion of other Business	-0.009** (-3.133)	-0.007* (-2.461)	-0.008* (-2.517)	-0.014* (-2.448)	1.145 (0.691)	1.146 (0.295)	-0.082 (-1.917)	-0.080 (-1.521)
Proportion of Non - scheduled	-0.001 (-0.134)	-0.003 (-0.097)	-0.001 (-0.037)	-0.007 (-0.041)	1.161 (1.145)	1.155 (1.146)	-0.065 (-0.093)	-0.071 (-0.092)
Adjusted R2	0.688	0.688	0.707	0.681	0.684	0.684	0.849	0.849

Type of Alliance	Strategic Alliance		Marketing Alliance		Complimentary Alliance		Parallel Alliance	
Variables	**Dependent Variable: Profitability (in log)**		**Dependent Variable: Profitability (in log)**		**Dependent Variable: Profitability (in log)**		**Dependent Variable: Profitability (in log)**	
	Before	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**
Hausman Stat	21.706**	21.673**	14.660**	14.223**	19.645***	19.852***	18.949**	19.402**
F Statistic	24.000***	23.002***	43.381**	42.097**	33.274**	32.368**	32.050***	31.143***
2 log (likelihood)	833.622	841.307	864.268	838.787	758.800	765.784	757.666	764.651

(* significant at 10%, ** significant at 5%, *** significant at 1%)

Appendix B

Table 3.a Airline revenue in 2001

	Revenue US $ (million)					
	passenger	**freight**	**mail**	**non-sched**	**Incidental**	**total**
Japan Airlines	6,757.5	1,122.2	109.6	124.0	611.9	8,745.2
All Nippon Airways	6,051.3	451.3	105.4	11.2	707.0	7,332.5
Singapore Airlines	3,479.8	570.0	5.0	8.8	211.6	4,289.0
Korean Air	2,406.2	1,137.3	37.5	251.8	551.2	4,395.0
Cathay Pacific Airlines	2,607.6	839.0	19.9	89.1	129.4	3,570.9
Thai International Airways	2,262.4	462.5	14.8	14.9	145.7	2,912.5
Malaysia Airlines	1,663.5	236.9	11.5	27.8	146.0	2,085.7
American Airways	14,083.5	491.2	133.1	16.6	884.1	15,638.8
United Airlines	13,466.0	513.3	190.9	12.6	1,882.3	16,087.4
Delta Airlines	11,875.7	378.7	121.1	29.6	806.1	13,211.2
Continental Airways	7,156.3	209.0	64.8	14.3	513.2	7,971.7
Northwest Airlines	8,218.6	605.5	105.0	53.1	586.3	9,591.8
US Airways	6,579.9	115.3	46.0	4.6	1,495.7	8,253.4
Air Canada	4,531.3	326.0	33.0	34.0	318.2	5,252.4
British Airways	9,018.4	675.5	44.8	26.9	60.9	9,826.5

	Revenue US $ (million)					
	passenger	**freight**	**mail**	**non-sched**	**Incidental**	**total**
Lufthansa Airlines	7,986.6	357.8	68.0	125.0	122.6	8,660.0
Air France	7,945.3	903.7	61.3	0	528.2	9,438.5
KLM Dutch Airways	3,514.4	899.7	0	35.3	583.2	5,032.6
Scandinavian Air System	2,795.0	151.2	684.5	11.0	856.9	4,498.6
IBERIA	3,143.8	198.9	17.1	6.8	491.7	3,867.0

Figure 3.a Proportion of each airline's revenue

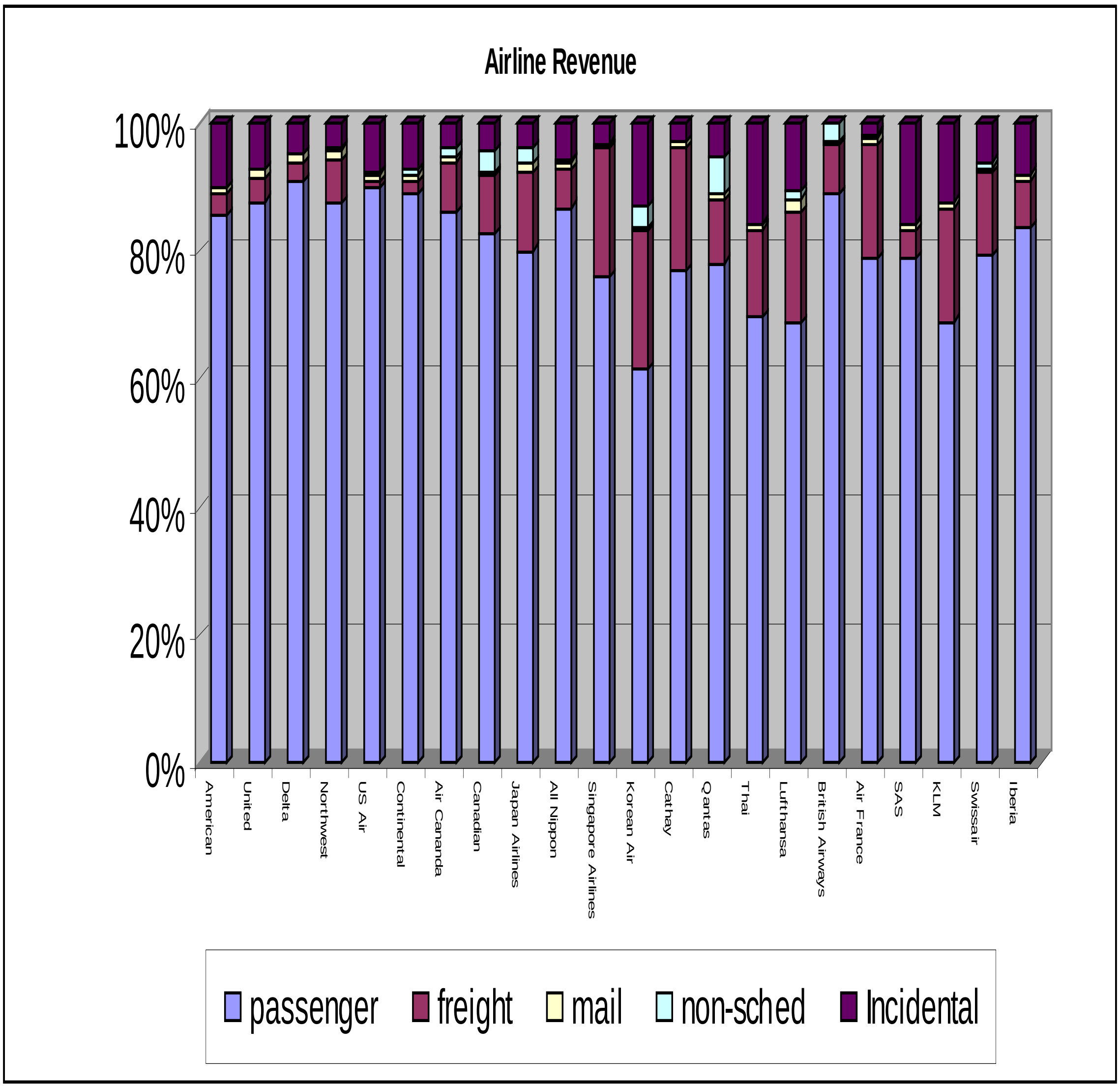


Table 3.b Airline outputs, 2001

	Output in RTK (million)				
	passenger	freight	mail	non-sched	Incidental Revenue
Japan Airlines	7284	4115	197	30	6.16
All Nippon Airways	4351	1213	123	11	7.12
Singapore Airlines	6618	5848	87	8	2.10
Korean Air	3437	5423	125	44	5.29
Cathay Pacific Airlines	4258	3887	50	7	1.32
Thai Internation Airways	3978	1669	54	7	1.43
Malaysia Airlines	3472	1532	2	2	1.44
American Airways	17085	2809	502	5	8.60
United Airlines	16887	2801	687	38	18.31
Delta Airlines	14089	1852	431	10	7.84
Continental Airways	8342	886	82	47	4.99
Northwest Airlines	10676	2789	355	110	5.70
US Airways	6708	489	132	45	14.55
Air Cananda	6039	1568	133	168	3.09
British Airways	9303	3936	97	5	0.60
Lufthansa Airlines	9200	7176	185	16	1.20

	Output in RTK (million)				
	passenger	**freight**	**mail**	**non-sched**	**Incidental Revenue**
Air France	8623	4633	203	24	5.20
KLM Dutch Airways	6144	3878	182	7	5.60
Scandinavian Air System	2263	620	52	6	8.37
IBERIA	3713	851	45	2	4.75

Table 3.c Airline input cost, 2001

	Expenditure (US $ Million)					
	Labor	Fuel	Flight	Ground Property	Other Material	Total
Japan Airlines	3087	2003	986	562	5380	10701
All Nippon Airways	1921	1897	761	421	4663	7559
Singapore Airlines	483	887	503	56	2363	4240
Korean Air	640	827	521	325	2304	4549
Cathay Pacific Airlines	976	676	363	81	1593	3585
Thai Internation Airways	1254	773	521	73	2465	4953
Malaysia Airlines	531	449	317	351	1342	2932
American Airways	6431	2278	2165	621	5896	16702
United Airlines	5928	2433	2399	432	5676	16234
Delta Airlines	4740	2103	1739	325	4897	13296
Continental Airways	1480	876	867	29	2269	5362
Northwest Airlines	3394	1585	1130	148	3447	9340
US Airways	3210	930	1273	135	2656	7861
Air Cananda	783	506	416	102	1100	2823
British Airways	2259	1450	1163	402	5596	10627
Lufthansa Airlines	2985	1170	873	305	5268	10281

	Expenditure (US $ Million)					
	Labor	**Fuel**	**Flight**	**Ground Property**	**Other Material**	**Total**
Air France	2835	1133	690	182	2266	6803
KLM Dutch Airways	1744	746	412	235	2376	5325
Scandinavian Air System	1270	381	361	68	2522	4467
IBERIA	1346	418	360	148	942	3071

Figure 3.b Airline input cost in each airlines

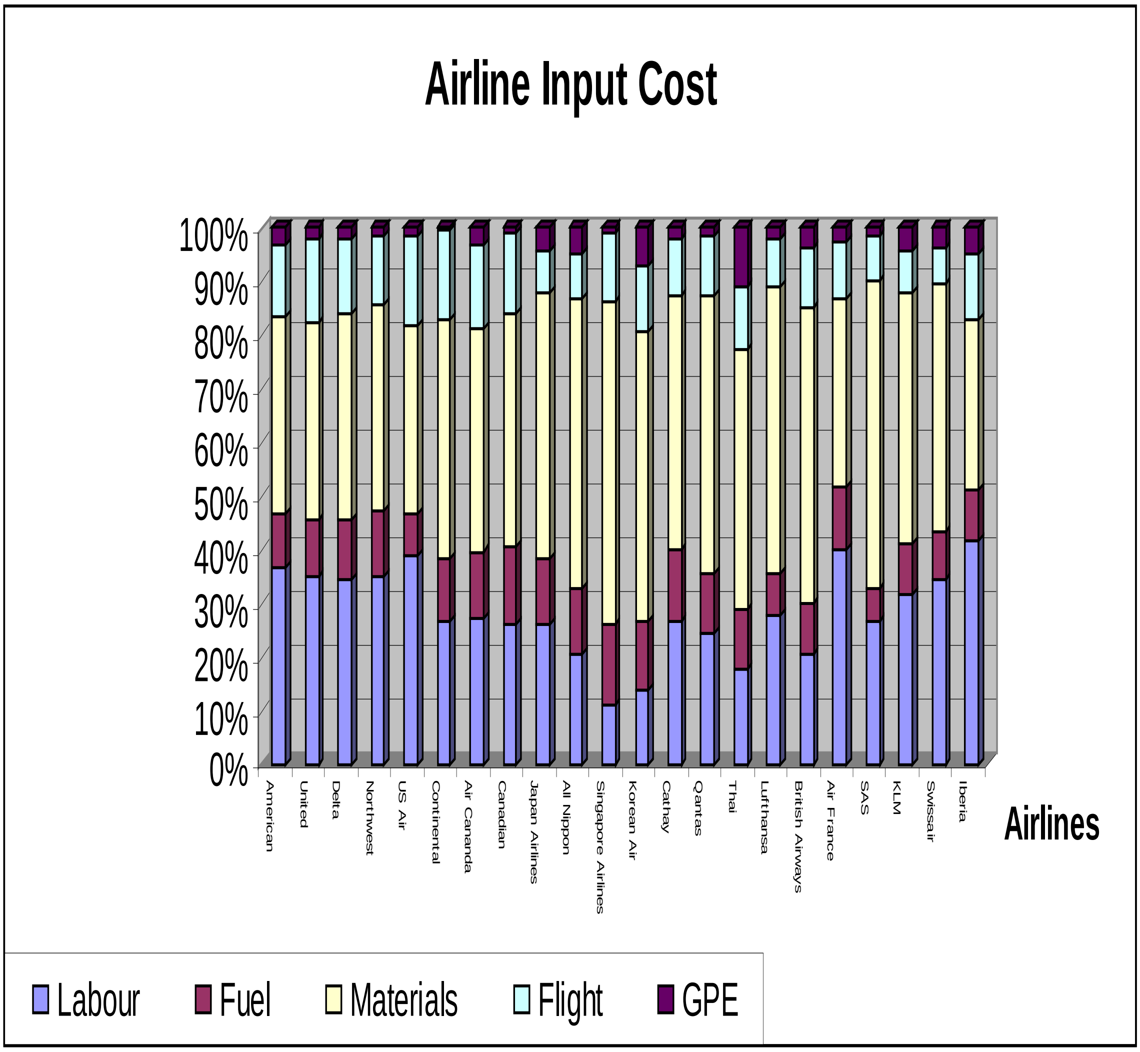


Table 3.d Airline input quantity,2001

	Input Quantity				
	Labour	**Fuel**	**Flight**	**Materials**	**GPE**
	(No.)	(Mill.Gal)	(Number of Seat)	(index)	(index)
Japan Airlines	16552	2305	59400	5.66	54.20
All Nippon Airways	13542	1115	40982	4.24	46.97
Singapore Airlines	14458	1444	47101	0.55	23.40
Korean Air	16820	1443	27747	3.12	22.14
Cathay Pacific Airlines	14473	1170	31373	0.82	16.19
Thai International Airways	25806	623	30726	0.72	24.26
Malaysia Airlines	21974	646	27684	3.46	13.23
American Airways	92360	4581	123066	6.04	57.34
United Airlines	84113	4626	132583	4.20	55.20
Delta Airlines	64652	3948	113170	3.16	47.62
Continental Airways	41003	1773	65243	0.28	22.07
Northwest Airlines	46161	2932	79142	1.44	33.52
US Airways	34116	1739	53673	1.31	25.83
Air Cananda	37143	618	45658	0.99	10.73
British Airways	55308	2314	74614	3.95	54.95
Lufthansa Airlines	39272	1965	63554	2.99	51.66
Air France	59160	1628	64009	1.79	22.29
KLM Dutch Airways	27009	1373	36942	2.26	22.80
Scandinavian Air System	21140	702	17760	0.66	24.63
IBERIA	26254	616	26070	1.43	9.10

Table 3.e Example of flight index

Fleet	Number of Seat	Number of Plane			Number of Seats		
		TG	MH	IB	TG	MH	IB
Airbus A300B4	256			6			1536
Airbus A300-600	393	21			8253		
Airbus A319	126			4			504
Airbus A320	150			47			7050
Airbus A321	210			3			630
Airbus A330-200	294		5			1470	
Airbus A330-300	408	12	4		4896	1632	
Airbus A340	250			13			3250
ATR ATR72	66	2			132		
Boeing 727-200	170			4			680
Boeing 737-200	125						
Boeing 737-400	170	11	40	1	1870	6800	170
Boeing 737-500	149						
Boeing 737-700	138						
Boeing 737-900	172						
Boeing 747-200F	390		4	6		1560	2340
Boeing 747-300	470	2	1	2	940	470	940
Boeing 747-400	509	15	18		7635	9162	
Boeing 747-400M	500						
Boeing 757-200	180			21			3780
Boeing 767-300	360			1			360
Boeing 767-300ER	360						
Boeing 777-200	440	8	13		3520	5720	
Boeing 777-300	368	5			1840		
De Havilland Canada DHC6	20		6			120	

Fleet	Number of Seat	Number of Plane			Number of Seats		
		TG	MH	IB	TG	MH	IB
Fokker F27	75		10			750	
McDonnell Douglas DC9-30	80			3			240
McDonnell Douglas DC9-87	110			24			2640
McDonnell Douglas MD11	410	4			1640		
McDonnell Douglas MD80	140						
McDonnell Douglas MD88	150			13			1950

Table 3.f Example of fuel use

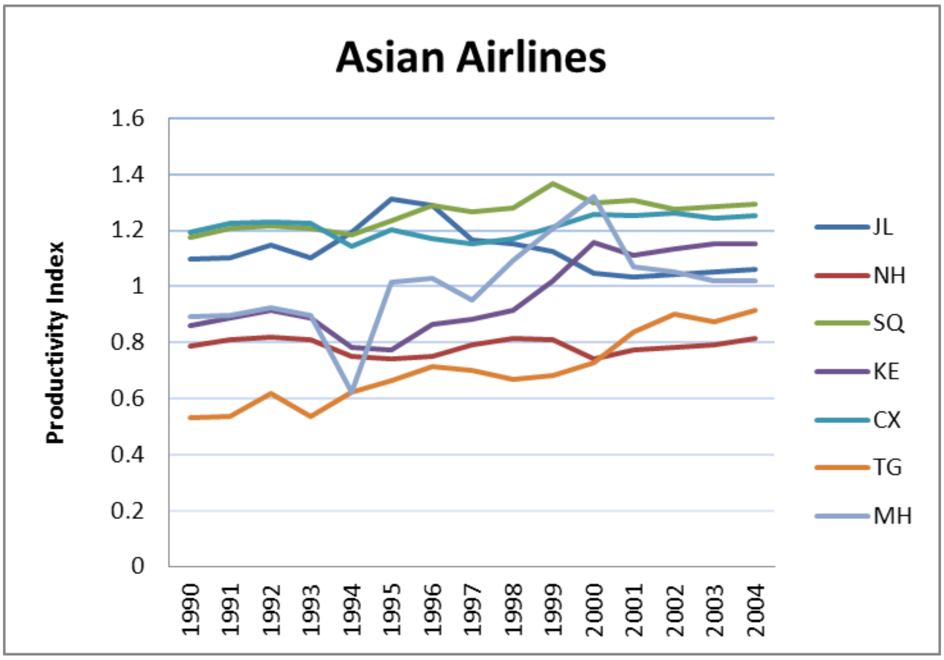
Fleet	Fuel used per hour	Hour Flown			Fuel Used		
		TG	MH	IB	TG	MH	IB
Airbus A300B4	1600			16854			26966400
Airbus A300-600	1678	54450			91367100		
Airbus A319	830			10015			8312450
Airbus A320	830			137113			113803790
Airbus A321	990			8510			8424900
Airbus A330-200	2000		19702			39404000	
Airbus A330-300	1900	39348	15762		74761200	29947800	
Airbus A340	2014			73926			148886964
ATR ATR72	167	3788			632596		
Boeing 727-200	1606			9885			15875310
Boeing 737-200	850						
Boeing 737-400	850	26407	116243	5240	22445950	98806550	4454000
Boeing 737-500	830						
Boeing 737-700	830						
Boeing 737-900	880						
Boeing 747-200F	3300		11714	22801		38656200	75243300
Boeing 747-300	3200	7104	130	10650	22732800	416000	34080000
Boeing 747-400	3700	70192	82147		259710400	303943900	
Boeing 747-400M	3800						
Boeing 757-200	1050			67277			70640850
Boeing 767-300	2001			7032			14071032
Boeing 767-300ER	2001						
Boeing 777-200	2000	26897	57341		53794000	114682000	
Boeing 777-300	2100	29870			62727000		
DE HAVILLAND CANADA DHC6	496		11708			5807168	

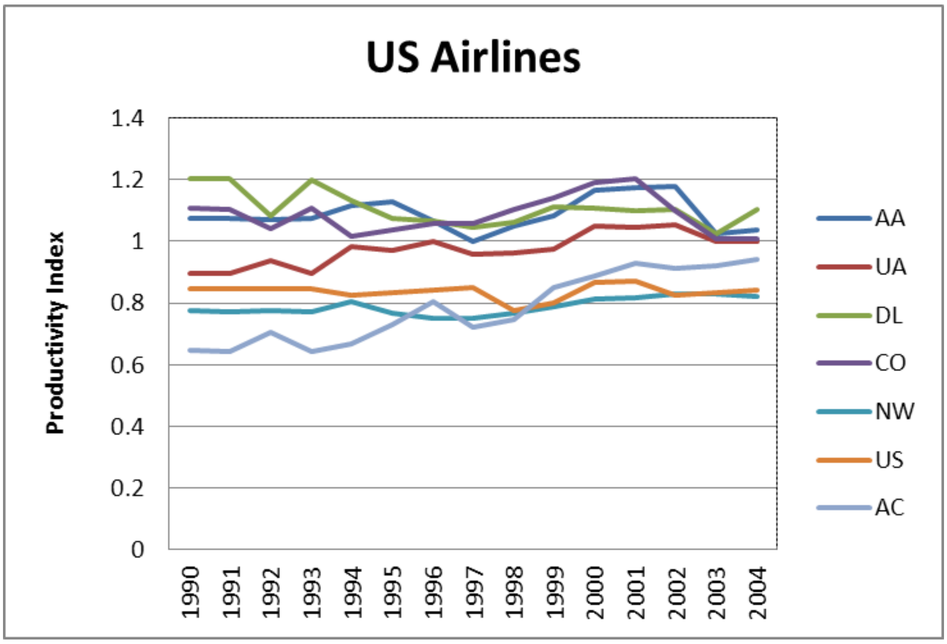
Fleet	Fuel used per hour	Hour Flown			Fuel Used		
		TG	MH	IB	TG	MH	IB
Fokker F27	596		25606			15261176	
McDonnell Douglas DC9-30	810			2833			2294730
McDonnell Douglas DC9-87	900			64599			58139100
McDonnell Douglas MD11	2428	14441			35062748		
McDonnell Douglas MD80	933						
McDonnell Douglas MD88	950			36248			34435600

Table 3.g Productivity indexes

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
JL	1.0970	1.1022	1.1451	1.1013	1.1909	1.3101	1.2877	1.1655	1.1522	1.1257	1.0483	1.0320	1.0432	1.0511	1.0621
NH	0.7873	0.8106	0.8170	0.8099	0.7518	0.7427	0.7498	0.7926	0.8140	0.8089	0.7386	0.7732	0.7824	0.7925	0.8147
SQ	1.1726	1.2073	1.2164	1.2062	1.1818	1.2327	1.2898	1.2633	1.2775	1.3662	1.2979	1.3061	1.2724	1.2814	1.2911
KE	0.8596	0.8851	0.9138	0.8843	0.7824	0.7722	0.8619	0.8812	0.9118	1.0208	1.1573	1.1094	1.1339	1.1496	1.1512
CX	1.1904	1.2256	1.2286	1.2245	1.1420	1.2021	1.1716	1.1532	1.1695	1.2103	1.2582	1.2500	1.2612	1.2413	1.2523
TG	0.5325	0.5350	0.6184	0.5359	0.6204	0.6642	0.7111	0.7009	0.6683	0.6816	0.7284	0.8344	0.9006	0.8744	0.9147
MH	0.8909	0.8951	0.9220	0.8965	0.9383	1.0147	1.0269	0.9485	1.0901	1.2072	1.3193	1.0687	1.0514	1.0211	1.0192
AA	1.0764	1.0752	1.0687	1.0768	1.1166	1.1278	1.0656	1	1.0503	1.0840	1.1665	1.1736	1.1787	1.0234	1.0377
UA	0.8971	0.8961	0.9383	0.8975	0.9851	0.9729	1.0004	0.9576	0.9637	0.9750	1.0503	1.0463	1.0544	1.0020	1.0013
DL	1.2047	1.2047	1.0819	1.2011	1.1308	1.0728	1.0656	1.0463	1.0615	1.1104	1.1064	1.0982	1.1023	1.0244	1.1023
CO	1.1059	1.1047	1.0432	1.1064	1.0157	1.0361	1.0595	1.0595	1.1033	1.1430	1.1919	1.2021	1.1003	1.0097	1.0088
NW	0.7744	0.7735	0.7763	0.7712	0.8058	0.7692	0.7529	0.7518	0.7671	0.7895	0.8140	0.8170	0.8313	0.8277	0.8195
US	0.8471	0.8471	0.8476	0.8446	0.8262	0.8344	0.8405	0.8507	0.7763	0.8007	0.8659	0.8721	0.8272	0.8341	0.8426
AC	0.6469	0.6444	0.7040	0.6439	0.6663	0.7305	0.8048	0.7233	0.7478	0.8517	0.8863	0.9291	0.9118	0.9217	0.9436
BA	0.8344	0.8412	0.8415	0.8425	0.9261	0.9281	0.9250	0.9301	0.8659	0.8802	1.0208	1.0035	1.0269	1.0144	1.0178
LH	0.8160	0.7627	0.8191	0.7620	0.8211	0.8435	0.8588	0.8283	0.8629	0.9709	1.0116	0.9607	0.9760	0.9732	0.9811
AF	1.0088	1.0137	0.9383	1.0137	1.1237	1.1023	1.1074	1.0728	1.0829	1.1155	1.1420	1.2327	1.1777	1.2147	1.2383
KL	0.7019	0.6632	0.7152	0.6642	0.6612	0.6795	0.7009	0.7549	0.6805	0.7376	0.7885	0.8109	0.8170	0.8216	0.8432
SK	0.7584	0.7620	0.7417	0.7620	0.7712	0.7814	0.7610	0.7254	0.6968	0.7783	0.8435	0.8099	0.7783	0.7991	0.8103
IB	1.0835	1.0823	1.0728	1.0840	1.0615	1.0565	1.0646	1.0000	0.9930	1.0697	1.1084	1.1074	1.1125	1.0999	1.1117

Figure 3.c Productivity index graph.





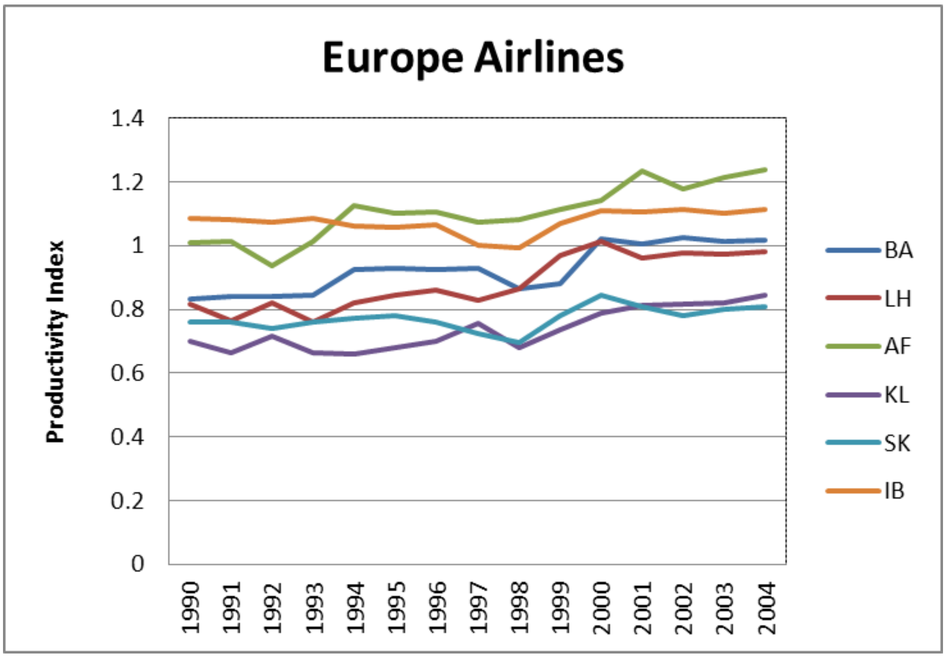
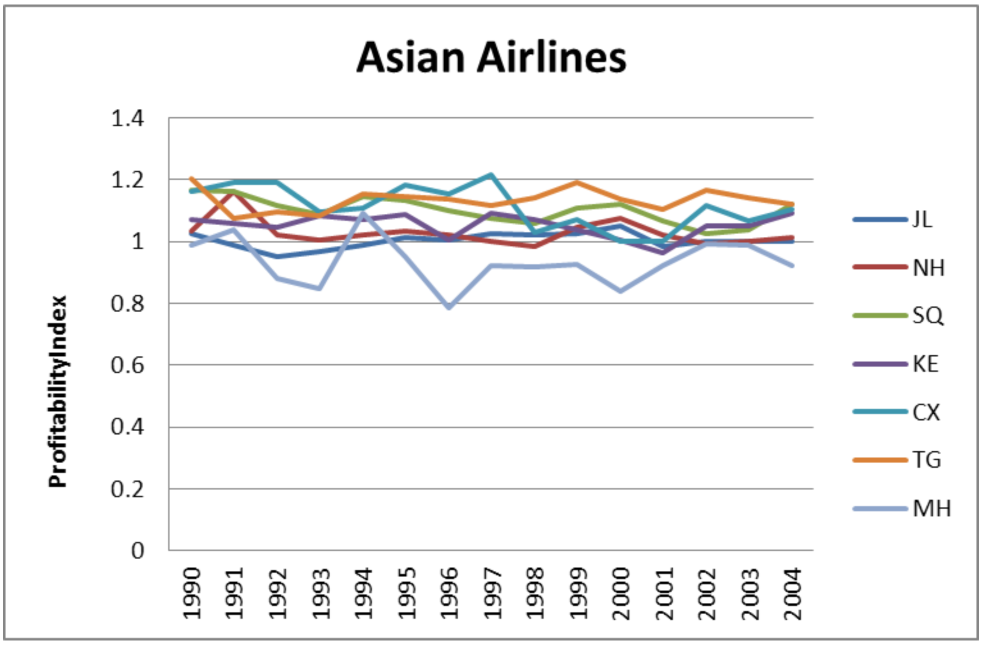
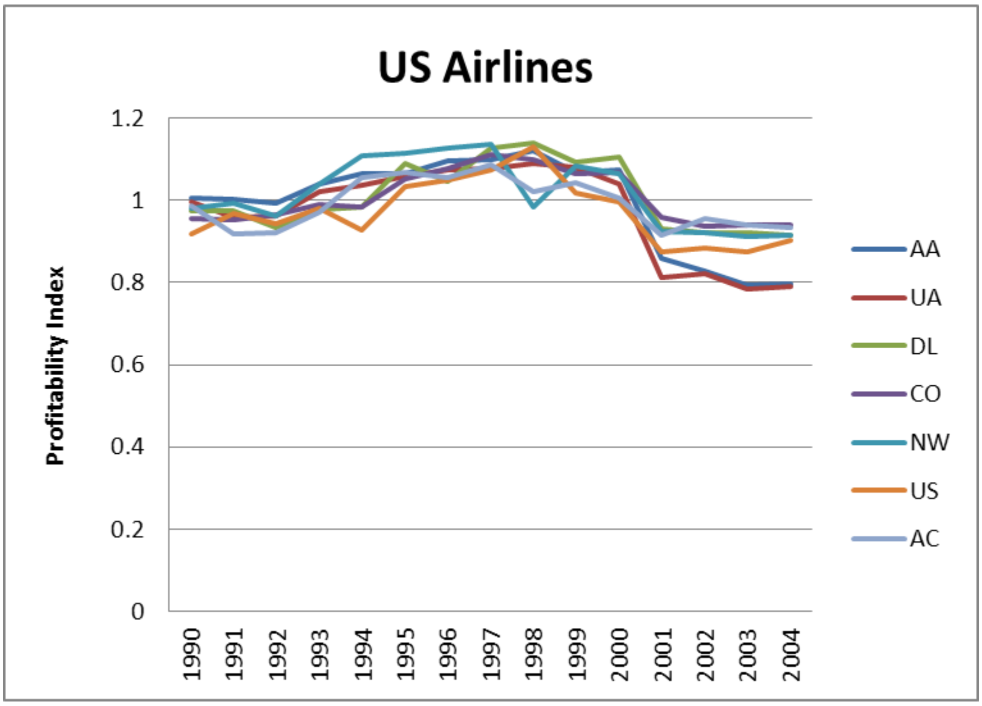

Europe Airlines
Productivity Index
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
BA
LH
AF
KL
SK
IB

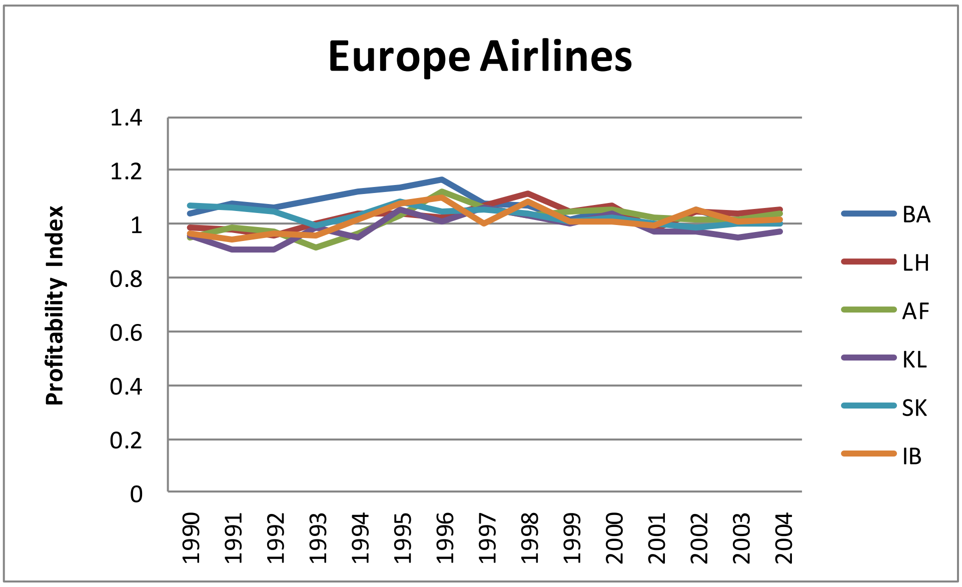
Table 3.h Profitability indexes

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
JL	1.0265	0.9879	0.9529	0.9692	0.9900	1.0148	1.0041	1.0277	1.0233	1.0270	1.0497	0.9852	1.0008	1.0012	1.0007
NH	1.0358	1.1612	1.0228	1.0073	1.0204	1.0334	1.0207	1.0007	0.9856	1.0451	1.0738	1.0206	0.9913	1.0001	1.0132
SQ	1.1659	1.1609	1.1157	1.0879	1.1445	1.1331	1.1013	1.0741	1.0597	1.1068	1.1193	1.0662	1.0267	1.0376	1.1204
KE	1.0696	1.0576	1.0488	1.0858	1.0707	1.0873	1.0056	1.0908	1.0702	1.0391	1.0041	0.9645	1.0496	1.0501	1.0932
CX	1.1635	1.1923	1.1928	1.0984	1.1091	1.1841	1.1535	1.2156	1.0312	1.0699	0.9992	1.0029	1.1163	1.0687	1.1032
TG	1.2052	1.0775	1.0946	1.0858	1.1538	1.1476	1.1373	1.1190	1.1430	1.1898	1.1385	1.1033	1.1687	1.1432	1.1216
MH	0.9883	1.0373	0.8818	0.8467	1.0933	0.9508	0.7880	0.9213	0.9193	0.9284	0.8392	0.9222	0.9920	0.9871	0.9217
AA	1.0062	1.0014	0.9943	1.0398	1.0649	1.0661	1.0964	1.1004	1.1202	1.0665	1.0737	0.8594	0.8273	0.7932	0.7971
UA	0.9951	0.9596	0.9625	1.0210	1.0384	1.0592	1.0744	1.0761	1.0892	1.0818	1.0398	0.8112	0.8216	0.7855	0.7912
DL	0.9738	0.9742	0.9338	0.9783	0.9829	1.0902	1.0448	1.1288	1.1397	1.0925	1.1053	0.9315	0.9230	0.9216	0.9164
CO	0.9556	0.9516	0.9640	0.9910	0.9825	1.0509	1.0775	1.1127	1.0994	1.0637	1.0687	0.9589	0.9386	0.9397	0.9391
NW	0.9808	0.9921	0.9627	1.0407	1.1088	1.1138	1.1282	1.1370	0.9854	1.0845	1.0645	0.9233	0.9211	0.9132	0.9146
US	0.9180	0.9677	0.9432	0.9809	0.9287	1.0348	1.0503	1.0741	1.1309	1.0167	0.9952	0.8748	0.8826	0.8762	0.9043
AC	0.9874	0.9197	0.9213	0.9722	1.0560	1.0689	1.0542	1.0870	1.0221	1.0417	1.0071	0.9158	0.9543	0.9416	0.9347
BA	1.0378	1.0775	1.0650	1.0938	1.1182	1.1328	1.1677	1.0730	1.0670	1.0136	1.0520	0.9826	1.0508	1.0006	1.0012
LH	0.9841	0.9767	0.9603	0.9993	1.0367	1.0397	1.0244	1.0658	1.1129	1.0449	1.0711	0.9817	1.0465	1.0399	1.0561
AF	0.9495	0.9854	0.9751	0.9145	0.9624	1.0320	1.1211	1.0651	1.0349	1.0432	1.0507	1.0231	1.0154	1.0162	1.0423
KL	0.9573	0.9042	0.9023	0.9874	0.9471	1.0512	1.0083	1.0608	1.0280	1.0031	1.0368	0.9738	0.9699	0.9521	0.9743
SK	1.0670	1.0604	1.0469	0.9916	1.0303	1.0837	1.0498	1.0556	1.0414	1.0070	1.0211	1.0026	0.9857	1.0003	1.0014
IB	0.9673	0.9443	0.9664	0.9545	1.0174	1.0751	1.0967	0.9995	1.0873	1.0094	1.0090	0.9943	1.0551	1.0099	1.0142

Figure 3.d Profitability index graph






Europe Airlines
Profitability Index
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1990
1991
1992
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1995
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2000
2001
2002
2003
2004
BA
LH
AF
KL
SK
IB

Table 3.i example of each type of alliance for Thai Airways

Strategic Alliance	Marketing Alliance
Adria Airways	Malaysian Airlines
Air Canada	Emirates Airlines
Air China	El Al Israel Airlines
Air New Zealand	China Airlines
All Nippon Airways	China Eastern Airlines
Aegean Airways	Royal Brunai Airlines
Asiana Airways	
Austrian Airlines Group	
Blue 1	
BMI	
Brussees Airlines	
Continental Airlines	
Croatia Airlines	
Egypt Air	
LOT Pulish Airlines	
Lufthansa	
SAS	
Singapore Airlines	
Spanair	
SA Express	
South African Airways	
SWISS	
TAM	
TAP Portugal	
Turkish Airlines	
United Airlines	
US Airways	

Vertical Alliance	Horizontal Alliance
El Al Israel Airlines	Air China
China Airlines	All Nippon Airways
Adria Airlines	Asiana Airlines
Air Canada	Austrian Airlines Group
Air New Zealand	Lufthansa
Aegean Airways	SAS
Blue 1	Singapore Airlines
BMI	South African Airways
Brussees Airlines	SWISS
Continental Airlines	Turkish Airlines
Croatia Airlines	United Airlines
Egypt Air	Malaysian Airlines
LOT Pulish Airlines	Emirates Airlines
Spanair	China Eastern Airlines
SA Express	Royal Brunai Airlines
TAM	
TAP Portugal	
US Airways	

History of Thai Airways

1990 :	Celebrate on THAI's 30th anniversary The second most profitable year in the Company's history
1991-1992	THAI became a full partner of AMADEUS Global Distribution System.
1993	The airline's frequent flyer program, Royal Orchid Plus was successfully launched.
1994	THAI was formally registered as Thai Airways International Public Company Limited.
1995	THAI hired international management consultants to help re-engineer the company.
1996	The first Boeing 777-200, with 358 seats, the widest cabin and tallest headroom of all twin-engine aircraft, joined the fleet. THAI's homepage on the Internet located at www.thaiairways.com was launched.
1997	THAI and 4 of the world's major airlines joined together to form the Star Alliance. THAI provided major sponsorship and official carrier support to the 13th Asian Games in Bangkok.

1998	THAI threw its support behind the "Amazing Thailand 1998/99" campaign. Thai's floral float under the "Amazing Thailand" theme at the world televised "Rose Parade" in Pasadena, California, was awarded one of the top prizes.
1999	THAI joined the nation in commemorating His Majesty the King's 72nd Birthday Anniversary.
2000	Destinations, providing passengers with increasingly modern and comfortable aircraft, saving the Kingdom of Thailand and the people of the world with the highest standards of air service and safety.
2001	THAI implemented the Customer Relationship Management (CRM) system.
2002	THAI introduced 4 new destinations - Mumbai, Chengdu, Busan and Kuwait. THAI achieved the highest net profit ever and operated with profitability for 38 consecutive years.
2003	THAI introduced Royal e-Service. THAI launched an e-Auction system for the Company’s procurement process to help reduce cost and create transparency.
2004	THAI signed a contract with InterBrand Co., Ltd to develop the Company’s new Corporate identity. THAI introduced new Premium Customer Service for its First and Business Class passengers. THAI invested 39% shares in “Nok Air”, a joint ventured low cost airline.

Figure 3.e Thai Airways productivity over time

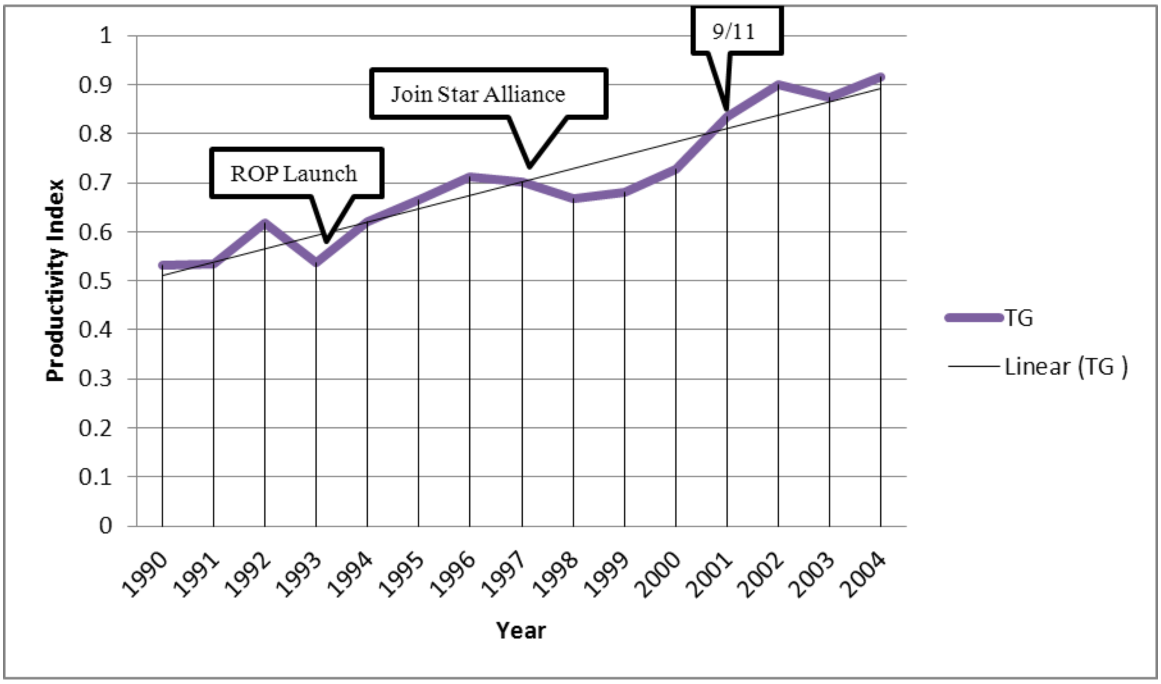
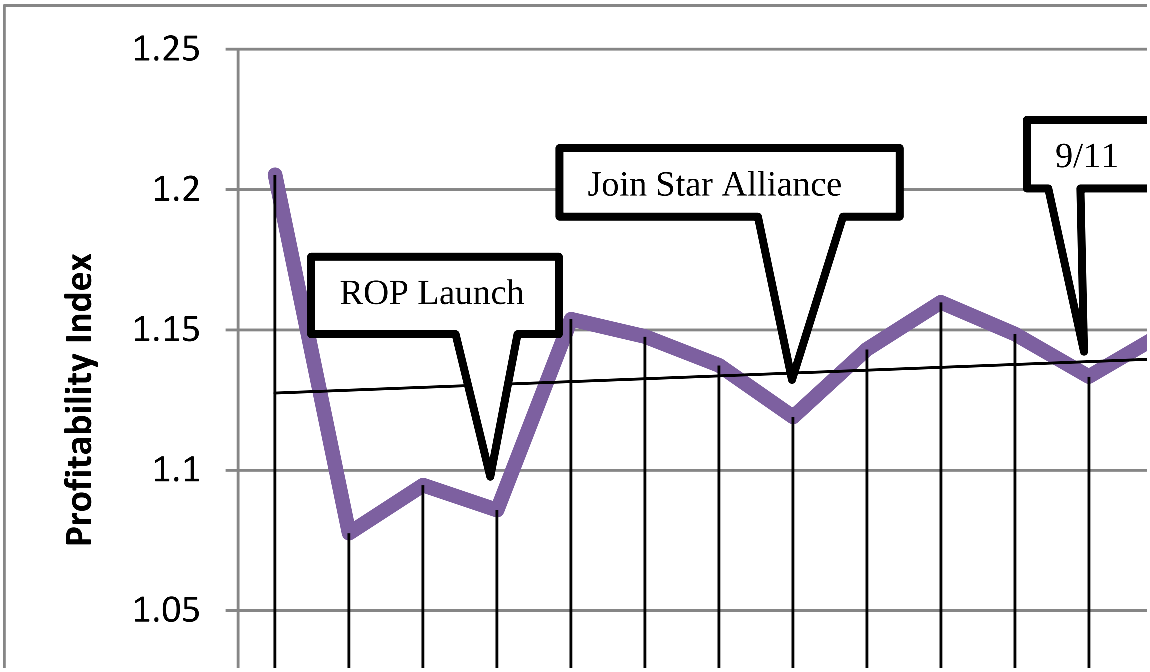


Figure 3.f Thai Airways profitability over time



Chapter 4

Effects of Strategic Alliances on Travelers' Perspectives And Their Choice of Airline Carriers in Thai Market

Introduction

Over the past two decades, the intensity of competition in the global airline industry has increased substantially as a result of deregulation and globalization. This has forced many airlines to undertake major restructuring to improve productivity and reduce costs. One of the means to do so has been the formation of strategic alliances, which allows airlines to improve revenue, reduce costs, and offer greater benefits to customers. Strategic alliances, which have increased in recent years, can be defined as alliances in which partners co-mingle their assets to pursue a single or joint set of business objectives.

Numerous studies have examined the effects of alliances on various aspects of the airline industry, such as their impacts on cost reductions, market entry, market share, and profitability. Porter and Fuller (1986), for example, argued that alliances enable firms to achieve increased economies of scale and profitability through joint operations, while Oum, et al. (2004) analyzed the effect of horizontal alliances on firm performance in terms of productivity and profitability. However, to date, there are few studies that examine airline's strategic alliances from the perspective of customers. One exception is the study by Goh and Uncles (2003) which focused on the perception of business travelers in Australia. Their results showed that a sizeable portion of customers was unsure of the alliance benefits and those benefits did not seem particularly important to the purchasing decision to their selection of an airline.

The aim of this study, inspired and enhanced from the survey methodology implemented by Goh and Uncles (2003), is to explore the impacts of three major global strategic alliances' benefits—Star Alliance, Oneworld and Skyteam—on travelers' (business and leisure) perspective and their choices of an air carrier.

In order to do so, it is useful to first look at various benefits alliances offerto airlines and to customers. The study then explains the research objectives and research questions in greater detail. The chapter explains further the methodology and outline of the survey data in section 1. Section 2 depicts the results and presents a discussion based on the survey data focused on whether Thai travelers are aware of alliance benefits, how they rate the benefits, how they see the difference among alliances. Furthermore, the chapter discusses passenger choices of air carriers and willingness to pay. Lastly, the chapter supplies a conclusion and states the limitation of this study.

1. Benefits of alliances, research objectives and question setting

Benefits of airline alliances, as emphasized in previous studies, can be divided into those from airlines' perspective, such as cost reduction, profitability, and those from travelers' perspective. By developing comparison of the potential benefits of airline to alliances, the following points have been raised.

Greater network access: Wider route networks can attract passengers due to travelers' preference on extensive networks (Driver, 1999). An airline can offer greater value to customers by extending its network of relationships with other airlines. An alliance airline can offer more itinerary choices than non-alliance airlines of a similar size (Oum and Park, 1997).

Seamless travel: Alliances provide passengers with seamless travel when transferring from one airline to another. For example, Star Alliance offers extensive code share flight options for its customers, manages quick transfers, and provides convenient check-in procedures. One additional benefit to seamlessness is the flexibility in changing or altering flight plans at short notice, especially for travelers flying on non-direct long-haul flights.

Frequent Flyer Program (FFP) benefits: In the past, FFP benefits were not transferable between airlines. However, with the formation of global alliances, FFP points can be accrued and other benefits can be enjoyed among any airlines within an alliance. This means FFP members can earn priority status faster under only one program, and awards and royalty can be redeemed with any partner airlines of the alliance.

Priority and extended lounge access: As a way to retain airlines' most valuable customers and maintain their customer experiences, special treatments have been provided and offered to customers in various forms, for instance, priority check-in, baggage handling, reservation waitlist, and airport standby. Global alliances also emphasize access to any alliance partner lounges as a part of benefits for their travelers with 'priority' status, offering greater access to priority benefits from all partner airlines.

Research objectives and questions

A majority of the literature on alliances in the airline industry have focused on the roles of firm size and the benefits of alliances to airlines, while very little attention has been paid to the benefits for travelers. The research aims to fill this gap and addresses questions such as whether the benefits offered by airline alliances are important to travelers and whether such benefits ultimately determine travelers' selection of an airline. The questions are formed by focusing on airline passengers, both leisure and business, in Thailand, since the airline market in Thailand is very unique in Southeast Asia in terms of competitiveness between full service carriers (FSC) vs. low cost carriers (LCC). Almost 100% of Thai travelers tend to choose their preferred airline even though they travel on a very cheap ticket or package tour. In addition, on top of the language problem, Thai people prefer convenience, comfort, and relax environment in such a way that they do not like to change or experience new things (Phavichit, 2007). Such reasons are the determinants in selecting the Thai airline market for this research.

If a traveler is to respond to communications about alliance benefits, he/she will have to undergo a series of steps: initial awareness of the benefits, knowledge of benefits, desire to take into account the benefits, and impact on travel choices (Rossiter and Percy, 1997). The questions in this research survey are formulated to seek travelers' understandings and preferences towards airline alliances based on Goh and Uncle's studies. The questions are also formed to find out if travelers are able to distinguish or realize the differences in benefits offered by each alliance. For instance, Oneworld's alliance strategy is based on consumer marketing such as co-branding, lounge access and integrated FFP, whereas Star Alliance takes the advantage of more than just consumer marketing by placing emphasis on extensive code sharing, coordinated schedules and route planning, joint pricing and inventory management, integrated information technology, integrated FFP, and joint purchasing (Gallacher, 1999). Even though they are different, clear distinctions can start to disappear from customers' point of view. Therefore, whether Thai travelers perceive differences between the major global alliances or not may give us an indication to understand the success of global alliances as a differentiating tool.

There are 4 questions asked

Question 1: Are Thai travelers aware of the benefits of airline alliances?

This question seeks to determine the level of customer awareness of the global alliance benefits. Measure provides insight into consumers' overall awareness of the benefits and give some indication of the effectiveness of marketing communication that focus on these benefits. The claim is that if consumers are not aware of the benefits they cannot be expected to change their attitudes or re-examine their airline choices in any meaningful way. This is a standard claim in communication studies.

Question 2: How do Thai travelers rate the benefits of airline alliances?

Given the publicized benefits of the global alliances for the consumer, how they evaluated these benefits? Have benefits, as promised by the global alliances, lived up to expectations? Dennis (2000) cautions that 'most airports are not designed with airline alliances in mind and multi terminal operations can create a major bottleneck of efficient ground handling', hence diminishing the promised benefits of seamless travel. This is due to the fragmented value chain where airports, air traffic control providers and support operations fail to work as a cohesive unit to meet the needs of airline consumers.

Question 3: To what extent do Thai travelers perceive the benefits of each major global alliance to be different?

Alliances are characterized by different levels of commitment and complexity. Oneworld is based on consumer marketing (such as co-branding, lounge access, customer support and integrated frequent flyer programs). The Star Alliance takes advantage of more than just consumer marketing, giving emphasis to extensive codesharing, coordinated schedules and route planning, joint pricing and inventory management. Despite these apparent differences, as alliances evolve, so the clear distinctions start to disappear. Therefore, whether business travelers perceive differences between major alliances may provide insights into the success of global alliances as a differentiating tool.

Question 4: What factors affect travelers' airline choice?

Assuming the global alliance benefits are indeed important to travelers, it is anticipated that there would be a concerted effort on the part of those customers who rate the benefits as important to choose airlines that belong to the same global alliance in order to maximize their benefits. I formally test the proposition that business travelers who rate the global alliance benefits as important will have a greater propensity to choose airlines in the same global alliance, compared to those who do not rate the benefits as important.

2. Methodology and descriptive of data set

In order to examine the effects of airline alliance on passengers' choice of carrier, this study empirically investigates how alliance benefits have affected Thai travelers. Therefore, a data set is constructed based on the survey conducted by the author at Suvarnabhumi International Airport, Bangkok, Thailand. The survey was aimed at Thai international passengers and was carried out over various times and routes at international departure gates and airline lounges—the latter for data of top tier members of FFP as well as business and first class passengers. To obtain observations on both leisure travelers and business travelers, two survey periods were chosen. The first was between 20 December, 2007 and 3 January, 2008, which included 8 working days, 4 weekends and 2 public holidays, a period when leisure travel was strong (73.4%). The second was from 9 to 22 June, 2008, which included 10 working days and 4 weekends, a period when business travelers was strong (68.9%). These passengers were presented with a questionnaire that, in addition to questions aimed at eliciting travelers' background, contained questions regarding travelers' airline alliances benefits.

The respondents to the survey and their characteristics can be broken down as follows: Gender: 57 percent of respondents were male and 43 percent were female. Age: Respondents were breaking down into six age groups (below 21 years, 21-30, 31-40, 41-50, 51-60, and above 60 years). The majority of passengers fell into the 31-40 and 41-50 age brackets. Occupation: The majority of passengers' occupations were private-firm employees and business entrepreneurs, capturing about 54% of the share of all respondents. Household monthly income: Passengers' household monthly income was categorized into six groups. The majority fell into the 40,001-60,000 Baht/month group, followed by the 60,001-80,000 Baht/month and 20,001-40,000 Baht/month groups. Compared to the average household monthly income in Bangkok in 2002 of 28,239 Baht, air travelers earned relatively high incomes. Purpose of trip: 69 percent of respondents were traveling for business, while the remaining 31 percent were traveling for leisure. FFP membership: 74 percent of respondents were members of at least one program, while 40 percent were members of two or more programs.

3. Survey finding and discussion

The results of the survey, based on following questions, are presented, ranging from Thai travelers' awareness of the benefits of airline alliances, how they rate offered benefits, to how they perceive the differences of benefits offered by the alliances researched in this study. The first question seeks to find the awareness of Thai travelers to the benefits of airline alliances. The second and third questions aim to find how Thai travelers rate the benefit of airline alliances and what extent Thai travelers perceive the benefit differences of each major global alliance (Star Alliance, Oneworld and Skyteam). The fourth question is to find factors affecting travelers' airline choice. Finally, the last section follows up with an empirical study of their indirect utility and customers' willingness to pay on their airline travel.

3.1 Are Thai travelers aware of the benefits of airline alliances?

Respondents were asked to state, in their opinion, whether the 9 statements were 'correct' or 'incorrect' with regards to the benefits of airline global alliances. They were also allowed to select an 'unsure' option for each statement. Table 6.1 lists the global alliance benefits statements in the survey, and their corresponding responses. All figures depicted in this section are rounded for ease of understanding. In general, there was a reasonable level of awareness of some of the benefits, however, misconceptions also existed. On average, 62% of leisure travelers were aware of various benefits, while the remaining 38% were either unsure or incorrect. In comparison, more than 85% of business travelers were aware of the benefits and only 15% were not. For alliance membership, both groups of respondents were aware of which airlines belong to which global alliances, especially for Thai Airways which belongs to Star Alliances. This is most likely because Thai Airways, the National Carrier, is the only carrier in Thailand that has joined an alliance.

The question with the highest incorrect answers for both leisure and business travelers (46% and 22%) was regarding code sharing, followed by the question regarding FFP points. Thai travelers' misconception about code sharing might be resulted from the fact that airlines did not promote or publicly advertised code sharing flights. This misconception might affect how travelers perceive the overall alliance product offering, for instances, when they expect to fly on a plane owned by their preferred airlines but instead are seated on the other code sharing airlines' planes with different service quality. This misconception can lead to a negative effect on consumer confidence which will be explained in further details in chapter 7.

3.2 How do Thai travelers rate the benefits of airline alliances?

This question was related to the rating of global alliance benefits. As shown in Table 6.2 and 6.3, the majority of both leisure and business travelers agreed that global alliances have resulted in greater network access (61.2% of leisure and 86.1% of business) and enhanced FFP benefits (59.5% for leisure and 84.7% for business). Moreover, 53.8% of business travelers agreed on quicker transfer benefits, 64.3% on extended lounge access and 60.8% on transferable priority status. On the other hand, a large percentage of leisure travelers were uncertain or disagree about convenient check-in procedure, extended lounge access, and quick transfer benefits. A majority of the respondents agreed that the global alliances has increased their benefit in obtaining enhanced FFP points rather than greater network access, transferable priority status and extended lounge access. Overall, business travelers rated global alliance benefits higher than leisure travelers. In addition, 'uncertain' answers were less prevalent amongst business travelers. This might be due to the fact that benefits are available only to high priority FFP membership travelers, of which business travelers are more likely to be a member than leisure travelers.

3.3 To what extent do Thai travelers perceive the benefits of each major global alliance to be different?

This question answers how each alliance enjoys competitive advantage in Thai market from the global alliance benefits. The result for each global alliance benefit is presented in Table 6.4 and 6.5. Overall, 46.5% of leisure travelers were uncertain about the differences in benefits offered among each alliance, since they did not experience the dissimilarity, especially among those who were not members of any alliance group. Unfortunately, business travelers also had the same perception as leisure travelers hence viewing each alliance's benefits as identical. According to leisure travelers, transferable priority status and network access were the only two benefits that exhibited differences among each alliance (47.2% and 38.5% perceived somewhat different or more, respectively) while smooth travel and number of service lounges exhibited identical feeling to business travelers. If travelers can not perceive any differences among benefits offered, the value of the airline alliance might not be a discriminatory factor when travelers choose an airline. The reason why travelers cannot differentiate between alliances may be because most are members of only one airline FFP and can identify with only one alliance. According to the survey, 76% of travelers only hold one effective FFP, Thai Royal Orchid Plus Program, while a mere18% hold 2 or more FFP programs.

3.4 What factors affect travelers' airline choice?

To examine whether the benefits of airline alliances determine airline choice, business and leisure travelers were asked to rate the importance of 20 factors in determining their choices of airlines. Six of these factors were directly related to the benefits offered by alliances (emphasized in bold in Table 6.6). The results suggest that global alliance benefits do not rank highly for both types of travelers. For business travelers, seamless travel ranks third, followed by safety and direct routes. Quick check-in ranks fourth, extensive networks seventh, and high FFP points ninth. Out of all alliance benefits, lounge access ranks last for business travelers, possibly reflecting the fact that it is available only to top tier FFP members. On the other hand, the most important factors affecting airline choice for leisure travelers is fare, followed by safety and a modern aircraft fleet. Alliance benefits, such as whether an airline is part of a preferred alliance, high offering of FFP points, and provision of seamless travel, only ranked fourth, fifth and ninth, respectively.

4. The effect of travelers' indirect utility and willingness to pay for their choice of travel

The results in prior section present the ranking of factors affecting travelers' airline of choice, though they are only based on draft scales. The benefits of airline strategic alliance can be analyzed in a more distinctive method by performing an empirical study on travelers' indirect utility and their willingness to pay, which in turn affect their choices of airlines, towards the factors presented above. This can be determined as follows.

The calculation of willingness to pay (WTP) indicators is one of the main objectives of studies making use of random utility models (RUM) belonging to the family of discrete choice models. The case of travel time savings is of particular interest. Given the importance of valuation of travel time savings (VTTS) measures in transport planning, it should come as no surprise that there is an ever increasing body of research looking at ways of representing the behavioral plausibility of VTTS estimates. While the representation of inter-agent taste heterogeneity and the relationship between respondents' socio demographic attributes and their WTP measures has been the topic of an ever increasing number of studies (see for example, Algers et al., 1998; Hensher and Greene, 2003; Fosgerau, 2006; Hess et al., 2005), comparatively little effort has gone into analyzing how respondents process the attributes describing the alternatives in stated preference (SP) surveys. However, there are potentially significant differences across respondents in their attribute processing strategies (APS), and not accounting for these differences can lead to biased WTP estimates, as highlighted in Hensher (2006a,b).

This paper looks at one specific issue that falls within the general field of attribute processing strategies, namely the existence of asymmetries in response to increases and decreases in attribute levels of SP alternatives in the presence of a reference alternative. We estimate models that incorporate different parameters associated with attribute levels that are either higher or lower than the base reference alternative level. This allows us to test whether respondents' preferences for an attribute are different depending on whether an attribute is either specified negatively or positively around the reference or neutral point The use of the referencing approach is made possible through the use of SP design strategies that relate the experiences of sampled respondents to the experiment (see for example, Hensher, 2004a).

4.1 Data and methodology

Description of data

The first state of the survey was an RP exercise, collecting data on the most recent international air trip along with socio-demographic information, and information on membership in frequent flier programs. Besides actual level-of-service information for the observed trip, the survey also collected qualitative data, indicating the level of satisfaction with the observed trip, along as airline dimension.

On the basis of the characteristics of the observed trip, a number of alternative flight options, in terms of airlines, were compiled, and the respondents were asked to rank them in order of preference. For the airline options, the ranking was performed under the assumption of equal fares. The rankings of airlines and airports thus serve as proxy variables for service quality attributes not included directly in the later model specification.

The SP survey uses a binary choice set. In each choice situation, the respondent is faced with a choice between the current observed trip, and an alternative journey option, compiled on the basis of the information collected in the RP part of the survey. These two alternatives are here after referred to as the RP alternative and the SP alternative.

Aside from the actual airline and airport names, from which access times can be inferred, the attributes used to describe the two alternatives in the SP survey include flight time, the number of connections, the air fare, the arrival time (used to calculate schedule delays), the check-in time, and the on-time performance of the various flights. No choice is given between different travel classes; this can be regarded as an upper-level choice, taken before the actual air journey choices.

- Frequent flier information (FFP) Three dummy variables were included in the base specification, to account for the effects of frequent flier membership. These were associated with standard membership, elite membership and elite plus membership.
- Connections: The number of connections for a given flight, with three possible levels, 0, 1 and 2. Instead of assuming a linear effect, two separate dummy variables were initially estimated, associated with single and double-connecting flights.
- On-time performance (OTP): For the RP alternative, information was collected on whether the flight was on time or not, while, for the SP alternative, five different levels were used, ranging from 50% to 90% probability of being on time. The high number of levels (7) of the attribute, in conjunction with the low number of observations for some of these levels, led to a decision not to use separate dummy variables for the different levels, but to use a marginal coefficient associated with the percentage on-time performance, in conjunction with appropriate non-linear transform where applicable.

Methodology

Specification and Data: A set of data covering 573 observations, 389 of which are business travelers, is used in this section. Since it is state preference data (SP), a model with multinomial logit (MNL) structure is used.

Multinomial logit regression is used when the dependent variable in question is nominal and consists of more than two categories. Multinomial logit regression is appropriate in cases where the response is not ordinal in nature as in ordered logit. Ordered logit regression is used in cases where the dependent variable in question consists of a set number (more than two) of categories which can be ordered in a meaningful way while multinomial logit is used when there is no apparent order.

The multinomial logit model assumes that data are case specific; that is, each independent variable has a single value for each case. The multinomial logit model also assumes that the dependent variable cannot be perfectly predicted from the independent variables for any case. As with other types of regression, co linearity is assumed to be relatively low, as it becomes difficult to differentiate between the impacts of several variables if they are highly correlated.

The random variables are distributed identically and independently across travelers and alternatives, but not across observations from the same group of travelers. Standard specification is used, with all parameters in the indirect utility function in a linear fashion. The independent variable is an indirect utility for each passenger in each alternative.

All variables on the right-hand side are the six factors affecting travelers' airline choices that are found to be significant according to the previous results, which include check-in time, air fare, flight time, frequent flyer program (FFP), on-time performance (OTP), and connecting time. A check-in time, rated fourth by business travelers and one of the perceived benefits of alliance, is measured in minutes it takes each traveler from reaching the counter until obtaining the boarding pass. An air fare, the first decisive factor leisure travelers use when choosing an airline, is defined as the price of air ticket quoted in Baht regardless of the service class. A flight time variable, included to determine the efficiency of transfer time which is one of alliances benefits, is calculated in minutes taken from airline scheduled flying and connecting (if applicable) time for each traveler. An OTP (on time performance), to observe the reliability of service provided by each airline, is defined as the mean of each flight performance in percentage points gathered from each airline's public data. The number of connecting flights is included to measure whether travelers are willing to pay more to fly on a direct flight, which is another benefit of strategic alliance. The number of flight connections is determined based on a flight route - zero for a direct flight and one for a flight with one or more stopover. A FFP variable, included to establish whether travelers concern about FFP membership, is set to one if a traveler is a member of the FFP program of the airline he/she is flying with.

An indirect utility V for the reference alternative r is given by:

$$V_r = \beta_1 + \beta_2 \text{checkintime} + \beta_3 \text{airfare}_r + \beta_4 \text{flighttime} + \beta_5 \text{OTP}_r + \beta_6 \text{Connecting}_{connecting,r} + \beta_7 \text{FFP}_{\text{FFP,r}}$$

where β_1 is a constant, β_2, β_3 and β_4 represent the marginal utility coefficients which affect passenger's check-in time, air fare, and flight time by one unit (1 Baht, 1 minute) respectively, and β_5 is related to airline OTP in percentage points. The $\text{Connecting}_{\text{connecting}}$ is a binary variable, where one means an itinerary with at least one connection. The FFP_{FFP} is also a binary variable, where one means a traveler is a member of the FFP of the airline he/she is flying with.

4.2 Finding and discussion

The results of the estimation are presented in Table 6.7. All of the marginal utility coefficients turn up with an expected sign and are significant. The results indicate that a longer check-in time, a higher air fare, a longer flight time, and longer connecting time all have negative effects on travelers' utility, while an increase in punctuality affect positively in higher utility. In addition, the coefficient values for connecting and FFP member flight of 0.5683 and 0.7704 respectively are very large, implying that travelers prefer direct flights and are satisfied with being members of FFP programs. This also supports my expectation that, in joining a global alliance, an airline would gain a network expansion and the benefit would be reflected in the travelers' ability to choose the most direct routes as possible. Conversely, leisure travelers prefer low airfares and higher FFP miles to any other alliance benefits, based on high coefficient values of 0.3417 and 0.6391 respectively. Shorter check-in time is less important for them than business travelers as indicated by a smaller check-in time coefficient for the former one.

The willingness-to-pay indicator shows that leisure travelers are willing to pay 2,742 Baht for alliance benefits and 1,973 Baht for a reduction in flight time by one hour. In comparison, business travelers are willing to pay as much as 3,021 Baht to earn alliance benefits, and three times as much for direct flights than leisure travelers. On the other hand, the difference between business and leisure travelers regarding their willingness to pay for shorter flying times is very small. Lastly, leisure travelers are willing to pay only 295 Baht to decrease one hour of check-in time, while business travelers are willing to pay up to 921 Baht. Therefore, reducing check-in time could be referred to as a hidden alliance benefit since priority check in is only for passenger in premium class cabin, first and business class, and passenger who holds top FFP member.

The results also imply that if airlines join alliance and impose campaigns such as Star Alliance's moving under one's roof, they can revolutionize more accessible airports with better seamless services, shorter check-in time and connecting time for passengers (e.g. from 120 to 90 minutes at Narita Airport, Japan). Moreover, they can extend network gains by possessing more direct flights through code sharing and can also minimize operation costs such as ground and lounging services, possibly resulting in the decreasing of airfare.

5. Conclusion, limitation and future research

For airlines, global alliances offer several benefits from market access and cost reductions to improvements in overall service quality and airlines' productivity and profitability, while providing benefits to travelers. The estimate results presented here suggest that travelers are willing to pay more if it enables them to earn more FFP benefits, cut down connecting time, and shorten flight time (i.e. travelers are more satisfied flying direct flights). Thai travelers rate benefits of alliances highest on greater network access, enhanced FFP benefits and seamless travel. However, such benefits are still unclear to most leisure travelers, which indicate that airlines should strengthen their marketing and advertise the benefits of alliances to travelers in order to help them understand the significance of alliances and how they could benefit from them. If leisure travelers understand alliance benefits to the same extent as business travelers do, they tend to start to choose their carriers by taking into consideration alliance benefits rather than purely the air fares. In addition, alliances should conduct market researches to tailor more distinctive alliance benefits and then use those to differentiate themselves from other alliances in order to attract new customers.

Nevertheless, travelers still and will rate very high for safety, modern aircraft and airfare, which are not benefits of forming alliances. Such consideration indicated that airlines could not consider only offering alliance benefits but also maintaining and improving their own operations and facilities.

The limitation of this study includes a few items. The first limitation is on the accuracy of the global alliance benefits, where the benefit lists are derived from promotional materials of the airlines which consumers might not necessarily be aware of. Moreover, some benefits are not aimed at ordinary travelers but only at high-priority travelers. The second concerns sampling issues. Random surveys were conducted only at Bangkok International airport, and not at any other provincial airports. Therefore, the survey sampling might not be sufficient to represent all Thai passengers. The third is a seasonal factor, since members of alliances can change over time, thus multiple surveys should be conducted at different points in time. In addition, a research comparing travelers' perceptions of an airline before and after it has joined an alliance would be beneficial. The last limitation is specifically relevant to Thailand market. The market, due to existence of a national carrier, can be described as competitive but still very uneven. Possible extensions of this paper include an empirical study on passenger choice behavior to examine the importance of global alliance benefits in determining airline choice by travelers.

Table 4.1 Responses to statements regarding global alliance benefits and membership

Benefit	Survey statement	Correct (%) L	Correct (%) B	Incorrect(%) L	Incorrect(%) B	Not sure (%) L	Not sure (%) B
Greater network access	Strategic alliances airline can offer more choices to its customers than non-alliance airlines of a same size (T)	83	90	9	3	8	7
Seamless travel	Strategic alliances can offer more code sharing flight options for its customers, providing quick transfers and check-in procedures. (T)	62	78	10	6	28	16
	Code sharing by the alliance partners means travelers have to fly on planes owned by their preferred airline. (F)	46	22	28	53	26	25
Transferable priority status	Priority status earned from one alliance member is extended to other members' airline, offering priority check-in, baggage handling and priority waitlist. (T)	73	94	9	0	18	6
Extended lounge access	"Priority" customers of a global alliance airline can gain access to an executive lounge of any of the partners. (T)	64	96	15	1	21	3
Enhanced FFP benefits	With the formation of global alliances, frequent-flyer points can be accrued from any airline within an alliance. (T)	80	92	5	2	15	6
	It is normal practice for frequent-flyers to earn twice as many points from their nominated airline than from other partner airlines on the same route. (F)	58	11	7	70	35	19
	While it is possible to earn frequent-flyer points on any airline in the global alliance, a customer can only						

Benefit	Survey statement	Correct (%) L	Correct (%) B	Incorrect(%) L	Incorrect(%) B	Not sure (%) L	Not sure (%) B
	redeem points on one nominated airline within the alliance. (F)	32	20	47	73	21	7
Alliance membership	Thai Airways is a member of Star Alliance. (T)	92	100	1	0	7	0

Note: L refers to leisure travelers and B to business travelers. T refers to true question and F to false question

Table 4.2 Thai leisure travelers' responses to ratings of global alliance benefits

Global alliance benefits	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree	Mean
Greater network access	0.4	17.4	21.0	43.5	17.7	3.6
Seamless travel						
Quick transfers	2.1	19.6	43.0	33.3	2.1	3.2
Flexible flight schedules	2.9	18.5	34.8	36.7	7.2	3.2
Convenient check-in	1.3	25.0	39.4	28.1	6.2	3.1
Transferable priority status	0.4	13.0	43.1	31.6	11.9	3.4
Extended lounge access	0.0	15.2	38.8	37.5	8.4	3.4
Enhanced FFP benefits	1.3	12.0	27.3	47.8	11.7	3.5
Average	*1.2*	*17.4*	*34.8*	*36.7*	*9.9*	*3.3*

Table 4.3 Thai business travelers' responses to ratings of global alliance benefits

Global alliance benefits	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree	Mean
Greater network access	0.4	13.3	0.2	68.6	17.5	4.1
Seamless travel						
Quick transfers	1.9	15.0	29.3	52.4	1.4	3.7
Flexible flight schedules	2.6	14.1	21.8	57.8	3.7	3.2
Convenient check-in	1.1	19.1	30.3	44.4	5.1	3.4
Transferable priority status	0.4	10.0	28.7	49.7	11.1	3.8
Extended lounge access	0.0	11.6	24.1	59.2	5.1	3.7
Enhanced FFP benefits	1.1	9.1	5.1	75.3	9.4	4.2
Average	*1.1*	*13.3*	*20.1*	*57.8*	*7.7*	*3.7*

Table 4.4 Perceived differences of alliance benefits among global alliances (leisure travelers)

Global alliance benefit	Extremely different (1)	(2)	Somewhat different (3)	(4)	Almost identical (5)	Not sure	Mean (excluding not sure response)
Network access	2.4	9.5	14.7	26.4	32.6	14.4	4.2
Smooth travel	0.0	0.8	1.4	19.4	29.3	49.1	4.3
Flexibility of changing flight plans	0.2	0.3	2.1	5.8	22.8	68.8	4.7
Transferable priority status	2.1	3.2	17.9	13.4	24.6	38.8	4.1
Number of lounges	0.0	2.2	4.7	24.6	19.4	49.1	3.9
Enhanced FFP benefits	0.3	1.8	6.7	8.6	23.9	58.7	4.1
Average	*0.8*	*2.9*	*7.9*	*16.4*	*25.4*	*46.5*	*4.2*

Table 4.5 Perceived differences of alliance benefits among global alliances (business travelers)

Global alliance benefit	Extremely different		Somewhat different		Almost identical	Not sure	Mean (excluding not sure response)
	(1)	**(2)**	**(3)**	**(4)**	**(5)**		
Network access	7.6	17.3	13.6	12.0	21.0	28.5	3.7
Smooth travel	0.0	1.4	2.4	13.2	27.6	55.4	4.6
Flexibility of changing flight plans	0.7	1.1	1.3	10.2	23.7	63.0	3.9
Transferable priority status	6.7	24.3	16.2	7.4	5.9	39.5	2.4
Number of lounges	0.0	2.4	6.8	38.7	24.6	27.5	4.2
Enhanced FFP benefits	1.3	1.8	7.4	8.2	27.6	53.7	4.7
Average	*2.7*	*8.1*	*8.0*	*14.9*	*17.2*	*44.6*	*3.9*

Table 4.6 Rating of 20 factors affecting airline choice

Leisure Travelers			Factors	Business Travelers		
Standard deviation	Mean	Rank		Rank	Mean	Standard deviation
0.81	3.8	9	Seamless travel as promised by global alliances	3	4.2	0.91
0.94	4.7	4	Airline part of my preferred global alliance	11	3.5	1.07
1.04	4.5	5	Large number of FFP points	9	3.7	0.83
0.87	3.7	10	Extensive network served by global alliance	7	3.8	0.73
0.75	3.1	15	Quick check-in	4	4.1	0.81
0.82	2.6	17	Unlimited lounge access on global alliance network	14	3.1	0.76
0.97	4.8	2	Reputation for safety	1	4.6	1.19
1.00	4.9	1	Cheapest available fare	12	3.3	0.95
0.79	4.2	7	Reliable baggage handling	8	3.7	0.84
0.85	3.4	12	Most direct routes and fewest stopovers	2	4.5	0.93
1.17	3.6	11	Convenient departure and arrival times	5	3.9	0.98
0.93	4.7	3	Modern aircraft fleet	13	3.3	1.11
0.86	4.3	6	Attentive service	15	2.8	0.87
0.97	3.3	13	Staff friendliness and helpfulness	17	2.5	1.01

Leisure Travelers			Factors	Business Travelers		
Standard deviation	**Mean**	**Rank**		**Rank**	**Mean**	**Standard deviation**
0.96	2.9	16	Flexible schedules	6	3.9	0.94
1.12	3.8	8	Good inflight food	16	2.5	0.85
1.04	2.5	18	Good executive lounge facilities	18	2.3	1.13
0.77	3.3	14	Fully reclinable seats	10	3.6	0.92
0.84	2.3	19	Onboard phone/fax	20	2.1	0.76
0.92	2.3	20	Onboard email	19	2.4	0.88

Note: Travelers were asked to rate the level of importance of each factor, assigning a number from 1 (not important at all) to 5 (extremely important). The columns labeled "Mean" show the mean of these values.

Table 4.7 Estimation results of indirect utility and willingness to pay

	Leisure travelers		**Business travelers**	
No. of respondents	184		389	
Adj. ρ^2	0.4962		0.4725	
	Estimate	**t**	**Estimate**	**t**
$\beta_{current}$	1.1242	2.89**	0.9832	3.59***
$\beta_{checkintime}$	-0.0017	-1.56	-0.0324	-2.53
$\beta_{airfare}$	-0.3417	-4.26***	-0.0042	-3.28**
$\beta_{flighttime}$	-0.0398	-1.54	-0.0423	-1.65**
β_{OTP}	0.0095	2.77**	0.1542	2.29*
β_{FFP}	0.6391	4.12***	0.7704	3.96***
$\beta_{connecting\ time}$	-0.0063	-3.98**	-0.5683	-2.01*
σ	1.1892	1.28	0.9816	2.84**
Willingness to pay indicator				
Check-in time reduction (Baht/hr)	295		921	
Flight time reduction (Baht/hr)	1,973		1,928	
On-time arrival (Baht)	564		893	
FFP benefits (Baht)	2,742		3,021	
Connecting time reduction (Baht/hr)	781		2,035	

Note: *, **, and *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively.

Appendix C

Questionnaires

1. Sex

   O Man O Woman

2. Age

   O Under 20 O 21-30 O 31-40

   O 41-50 O 51-60 O 61 and above

3. Status

   O Single O Married number of kids ________ person

4. Job

   O Students O State Employee

   O Private Employee O Business Owner O State Enterprise Employee

   O Daily Worker O Not Employed/Retired O Others_____________

5. Average income per month

   O Below 20,000 bath O 20,001 – 40,000 bath O 40,001 – 60,000 bath

   O 60,001 – 80,000 bath O 80,001 – 100,000 bath O More than 100,000 bath

6. Place of ticketing

   O Internet O Travel agent O Airline office

7. International flight (round trip) you fly within 1 year

   O Less than 3 O 4-6 O 7-9 O More than 9

8. Ticketing airline

○ TG flight number ____ ○ NH flight number ____ ○ UA flight number____

9. Class of service

○ Business and above ○ Economy

10. Alliance membership

○ Gold ○ Silver ○ General member ○ not a member

11. Purpose of travel

○ Business ○ Personnel ○ Leisure ○ Return Home ○ Others

12. Decision maker

○ Yourself ○ Travel Agency ○ Secretary ○ Others

13. Experience of Code-Share flight

○ Yes ○ No

14. Code-sharing flight time known

○ Before buying ticket ○ At ticketing ○ At Check-in

○ When boarding the aircraft ○ Do not know

Question 1: Please put (x), in their opinion, whether the statements is 'correct' 'incorrect' or 'unsure' regard to the benefits of airline global alliances.

Benefit	Survey statement	Correct (%)	Incorrect (%)	Not sure (%)
Greater network access	Strategic alliances airline can offer more choices to its customers than non-alliance airlines of a same size (T)			
Seamless travel	Strategic alliances can offer more code sharing flight options for its customers, providing quick transfers and check-in procedures. (T) Code sharing by the alliance partners means travelers have to fly on planes owned by their preferred airline. (F)			
Transferable priority status	Priority status earned from one alliance member is extended to other members' airline, offering priority check-in, baggage handling and priority waitlist. (T)			
Extended lounge access	"Priority" customers of a global alliance airline can gain access to an executive lounge of any of the partners. (T)			
Enhanced FFP benefits	With the formation of global alliances, frequent-flyer points can be accrued from any airline within an alliance. (T) It is normal practice for frequent-flyers to earn twice as many points from their nominated airline than from other partner airlines on the same route. (F) While it is possible to earn frequent-flyer points on any airline in the global alliance, a customer can only redeem points on one nominated airline within the alliance. (F)			
Alliance membership	Thai Airways is a member of Star Alliance. (T)			

Question2: please rate global alliance benefits to you?

Global alliance benefits	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree	Mean
Greater network access						
Seamless travel						
Quick transfers						
Flexible flight schedules						
Convenient check-in						
Transferable priority status						
Extended lounge access						
Enhanced FFP benefits						
Average						

Question3: Do you think OneWorld, Star Alliance or Skyteam benefits are different?

Global alliance benefit	Extremely different (1)	(2)	Somewhat different (3)	(4)	Almost identical (5)	Not sure	Mean (excluding not sure response)
Network access							
Smooth travel							
Flexibility of changing flight plans							
Transferable priority status							
Number of lounges							
Enhanced FFP benefits							
Average							

Question4: please rank the factors affecting your airline choice

Factors	Rank
Seamless travel as promised by global alliances	
Airline part of my preferred global alliance	
Large number of FFP points	
Extensive network served by global alliance	
Quick check-in	
Unlimited lounge access on global alliance network	
Reputation for safety	
Cheapest available fare	
Reliable baggage handling	
Most direct routes and fewest stopovers	
Convenient departure and arrival times	
Modern aircraft fleet	
Attentive service	
Staff friendliness and helpfulness	
Flexible schedules	
Good inflight food	
Good executive lounge facilities	
Fully reclinable seats	
Onboard phone/fax	
Onboard email	

Chapter 5

Airlines' Service Quality of Code Sharing Flights:

Evidence from Thai passengers

Introduction

Since the late 1980s, strategic alliances have become a prominent form of business arrangement. Early assessment emphasized the need for strategic alliances as a result of the changed business environment whereby collaborative or cooperative strategies were proposed as counterparts to competitive strategies as a key strategic management tool (Ohmae, 1989). Critical issues such as the definition of strategic alliances (Varadarajan and Cunningham, 1995), motivations to enter these arrangements, key factors for their success, and selection criteria for alliance partners (Harvey and Lusch, 1995) were subsequently studied. However, there was a lack of research on the impact of alliances on customers (Weber, 2002). The possible reason for this is that the vast majority of work has focused on products rather than services, overlooking the key effect of the strategy (O'Farrell and Wood, 1999).

Delivering high-quality service to passengers is essential for airlines' survival. Service quality conditions influence a firm's competitive advantage by retaining customer patronage, which leads to market share and ultimately profitability (Morach and Ozment, 1994). The delivery of high-quality service becomes a marketing requirement as competitive pressures increase on air carriers (Ostrowski et al.,1993).

To deliver better services to passengers, airlines need to understand passengers' need and expectations (Aksoy et al., 2003). Studies in other sectors, such as tourism suggest that customer satisfaction and service quality judgments involve consumers comparing their prior expectations to actual service performance. Where customer satisfaction and loyalty have been examined in the air transport context, factors such as service values and corporate image seem to be ignored. Such omission, however, could cause problems of model misspecification and weak predictive power (Cronin and Taylor, 1992).

The area of service failure and recovery has received considerable attention (Sparks and McColl-Kennedy, 2001). So far, the research has been limited to investigating the effects of service failure/recovery on a customer’s evaluation in which an organization is the sole service provider, while the situation in which two or more service providers are closely linked in the provision of services by means of an alliance have been ignored.

Empirical studies of demand for airline services show that service quality is central to the choice of airlines for both business and leisure travelers (Bureau of transport and Communications Economics, 1994). According to Butler and Keller (1992), only the customers can truly define service quality in the airline industry. Chang and Yeh (2002) argued that it was difficult to describe and measure quality in airline services due to its heterogeneity, intangibility and inseparability. It is in this context that SERVQUAL has been proposed as a valid and reliable model in airline service quality studies (Gilbert and Wong, 2003).

A majority of the previous SERVQUAL based empirical studies of airline service quality were performed on the basis of the respondents’ mean scores built on Likert scaling. The categories in ordinal scales are ranked through their properties. As it is a ranking, frequencies or percentages are more appropriate statistic than means and standard deviations to obtain meaningful interpretations. If means or standard deviations are preferred, passengers’ raw scores should be transformed into quantitative interval scores. In order to achieve this transformation, factor loads produced through factor analysis might be used as an alternative tool. In factor analysis, ‘a factor load on an observed variable is conceptualized as a properly weighted and summed combination of the scores on factors that underlie it’ (Tabachnick and Fidell, 2001). With this as a starting point, the present study focuses on measuring airline service quality from the point of view of international passengers by using weighted SERVQUAL scores as a new calculation method.

This study differs from earlier research in significant aspects. First, it presents a general framework for measuring passengers' expectations, perceptions and overall assessments based on factor loadings instead of their mean values. Second, it is one of the first applications of SERVQUAL that simultaneously examines both passenger expectations and perceptions in an international strategic alliances platform. Third, the survey procedure is performed after a flight and analyzes how strategic alliances, educational level, flight frequency and purpose of travel affect passengers' expectations, perceptions, and overall quality assessments on the basis of scores produced through the calculation method. The study also identifies possible areas in which service quality needs to be improved through negative scores. Fourth, this is the first study which includes satisfaction, fare satisfaction and purchase intention questions within the survey. Those questions are an aid in increasing linkage of those specific variables. This will show clearly what factors effects passengers' loyalty to airlines via purchase intention.

The present chapter begins with the theoretical background on code sharing and airline service quality, together with past research involved with SERVQUAL method. It then presents the methodology which explains the questionnaire design, hypothesis and sampling and survey procedure The results of each aspect are given before providing the conclusion for the first section.

Analysis one of this chapter involves SEM analysis to show the structural relationships of passenger's expectation and perception gap and overall satisfaction, fare and future purchase intention. This analysis is also given in the form of introduction, theoretical background, SEM analysis results, and ends with conclusion, including limitations and future research.

1. Theoretical background

In the modeling passengers' decision-making process, the key variables normally considered include service expectation and perceived performance. This section will initially introduce the definitions of these variables.

1.1 Types of code-sharing

In the international air transportation sector, code-sharing can be classified into several types according to: the purpose of the code-sharing cooperation between carriers; the type of commercial cooperation between code-sharing carriers; the network complexity of the code-sharing service. Theoretically, a carrier looks for a code-sharing agreement with another carrier for three primary reasons, namely market presence, cost efficiency and regulatory constraints.

In practice, however, these reasons can be combined. A carrier may wish to enlarge its market presence by offering more destinations or higher frequencies under its own brand name. This goal can be achieved most cost-efficiently by not operating the service with its own aircraft and personnel, but by selling a part of the whole capacity to another airline on a route under its own name. Five main types of commercial agreements between code-sharing carriers are distinguished. They are listed as follows indicating a growing degree of commercial cooperation: free sale; blocked space; wet lease; franchise; joint venture.

With regards to the network complexity of an air service offered with code-sharing, the following types of services can be distinguished: gateway to gateway flight; domestic flight connecting with an international flight; international flight connecting with a domestic flight; international flight connecting with an international flight. Two advantages for airlines offering code sharing are: the expansion of route networks and market presence without incurring the respective costs, and; the advantages obtained from the displays of computer reservation systems.

Travelers can benefit if code-sharing leads to a larger number of well-organized connecting services and special fares offered by different carriers. The most important disadvantage, however, is that code-sharing leads to consumer dissatisfaction on the unexpected service.

1.2 Service Quality

The concept of service quality as a comparison between customers' expectations and actual services performed has obtained wide acceptance following the studies of Parasuraman et al. (1991, 1994). The extensively used measure of service quality is SERVQUAL, and according to the disconfirmation of expectations model (Oliver, 1980), whenever the performance exceeds the expectations, the expectation is confirmed. Despite criticism from other researchers, SERVQUAL remains the most commonly used diagnostic model for evaluating service quality and the development of service quality strategies. However, Zeithaml et al. (1996) maintained that the performance-expectations difference measure would be appropriat if the primary purpose was to accurately diagnose service shortfalls. Additionally, it has been noted that disconfirmation may explain the perceived variance in service quality more than mere performance (Parasuraman et al., 1994).

The SERVQUAL has been adapted not only to other specific industries, products and target markets, but also to airline service studies (Park et al., 2004). In the current paper, the expectation and perceived performance measurements based upon the SERVQUAL are adopted while the service attributes are modified based on the features of airline services.

1.3 SERVQUAL in airline services

Understanding exactly what customers expect is the most crucial step in defining and delivering high quality service (Zeithaml et al, 1996). Like in other industries, the problem in the airline industry is whether management can correctly perceive what customers want and expect. Expectations serve as a major determinant of a consumer's service quality evaluation and satisfaction (O'connor et al.,2000). At this point, the 'voice of the customer' should be taken into the design process using advanced techniques, such as experimental design, quality function deployment, and value engineering. After delivering the services, service providers should monitor how well the customers' expectation and perception have been met. For this task, SERVQUAL offers the most suited model for evaluating customers' expectation and perceptions.

SERVQUAL has five main dimensions to measure service quality: tangibles, reliability, responsiveness, assurance, and empathy (Zeithaml et al., 1990). Customers evaluate the quality of service by determining whether there is any gap between their expectations and perceptions. SERVQUAL is based on the idea that quality is a subjective customer evaluation, as service is not a physical item, but an experience (Parasuraman et al,1998). Therefore, customers' perception is a better measure than other performance measures (Akan, 1995), while expectations are considered a starting point in SERVQUAL.

In addition to SERVQUAL-related studies, many scholars measured airline service quality through various quality dimensions. Gourdin (1988) categorized airline service quality in terms of three items: price, safety, and timelines. Ostrowski et al.(1993) measured service quality with timeliness, food and beverage quality, and comfort of seat dimensions. Truitt and Haynes (1994) used the check-in process, the convenience of transit, the processing of luggage, timeliness, seat cleanliness, food and beverage quality, and handling of customer complaints as the standards of service quality. Bowen and Headley (2000) indicated on-time arrival, mishandled baggage, being denied boarding and airline safety. They also added passenger complaints on items such as flight, reservation, ticket and boarding problems, fares, refunds, customer service, advertising, and frequent flyer programs to their findings.Although quality dimensions used in evaluating airline services vary extensively, they can be classified comprehensively within the SERVQUAL dimensions. While most of the previous studies are constructed on respondents' mean scores, weighted SERVQUAL points can be perceived as an alternative.

2. Analysis One focuses on finding travelers' service expectation and perception gap

2.1 Methodology

2.1.1 Questionnaire design

The questionnaire was designed in several steps and was in sync with prior literature. First, the descriptive variables for each airline were determined such as gender, age, airlines' frequent flyer status, educational level, job position, average use of airline services and purpose of the trip.

Next, the SERVQUAL and airline service quality dimensions were taken into consideration under the inspiration of previous studies. Even though SERVQUAL presents general quality dimensions for service industries, it does not include specific dimensions for airline industry service. Chang and Yeh (2002) asserted that, 'service quality attributes are context dependent and should be selected to reflect the service environment investigated'. Then questions addressing expectations and perceptions were rated from 1=strongly disagree to 7=strongly agree, and expectations were rated from 1= unimportant to 7= very important.

2.1.2 Hypothesis formulation

H1: Expectation and Perception of Thai's passengers are different among each service factors, which safety becomes the most important factor.

H2: If passengers have different code-sharing experience, class of service, airline ticket purchased, there will be significant difference in their perception and expectation gap of desired airline service quality.

2.1.3 Sampling and survey procedure

The samples were taken from the passengers on direct flight of an international airline that flew from Narita International Airport to Bangkok International Airport. The survey was administrated over 2 weeks during August 1st -15th, 2009, at Bangkok International airport, an international air travel hub with

245,719 flights departing and arriving and approximately 330 flights scheduled to depart each day in 2008 (source: Airport Authority of Thailand, 2008), and the total number of passengers being flown throughout the year 2008 reached 38 million. Therefore, these airport profiles meet the fundamental requirement of this research to conduct the study on air travelers' view on strategic alliances.

To ensure the samples were representative of airline alliances, the survey procedure was conducted on 6 direct flights from Narita to Bangkok, including All Nippon Airways, NH; Thai International Airlines, TG and; United Airlines, UA. After flight mail survey was also conducted in order to attain both expectation and perception. Questionnaires were distributed to 10 passengers from each flight at the baggage claim area and collected by self-achieved mail. Participation was voluntary. The sample size was 315 to represent the Thai population.

2.2 Results

2.2.1 Descriptive results and validity

The survey was carried out in the first two weeks of August 2009 and the response rate was approximately 32.7%. The questionnaires were completed by 46.7% females and 53.3% males. As for the age group, 60.6 % of passengers aged around 21 years old to 40 years old. Approximately 53.8% of the respondents were private employees and/or business owners while 3.33% were daily workers or freelances. Among the surveyed, 26.30% had approximately 20,000-40,000 baht monthly income, while 24.30% earned more than 100,000 baht per month, showing that most international travelers in this survey were middle-class and above.

For the Alliance point of view, 73.3% used their own ticketing airline and the remaining 26.37% flew on code-sharing flights. While only 5.23% did not take part in alliance membership, 39.43% were general members, 34.90% were silver card holders and 20.43% were gold card members. Thenumbers signify that as of 2009, most passengers were aware of their alliance benefits.

The most impressive question was about code-sharing. Surprisingly, 37% of the passengers would buy code-sharing flight again while 34% would not, and 29% do not mind to purchase again.

Twenty four questions from the SERVQUAL scale were reworded to cater to the airline context and were derived from the passengers' key purchase criteria. The questionnaire was constructed with an acceptance of the general validity of the SERVQUAL (Zeithaml et al., 1990). A test on the questionnaire confirmed the content validity. Exploratory factor analysis was performed and 7 factors were extracted from the expectation data set via principal components analysis (PCA). These factors were labeled as: (1) Empathy; (2) Availability; (3) Employees; (4) Tangibles; (5) Responsiveness; (6) Reliability and assurance, and; (7) Flight pattern. Factor loadings given in Table 7.1 were perceived as service quality dimensions for the purposes of the study and were compatible with the previous research, indicative of the validity of the study.

2.2.2 Hypothesis test and findings

The gaps between expectations and perceptions on mean scores are examined. The analysis statistically focuses on the differences of means of expectation and perception scores for each factor: Empathy, Availability, Employees, Tangibles, Responsiveness, Reliability and assurance, and Flight pattern.

H1: Expectation and Perception of Thai's passengers are different among each service factors, which safety become the most importantfactor.

As F_{tei} and F_{tpi} were defined as expectation and perception for each passenger respectively at a 0.05 significance level, the hypothesis test for this comparison, apart from the main hypothesis of this study, was conducted as follows:

$$H_0 : \mu F_{te} = \mu F_{tp}$$

$$H_1 : \mu F_{te} \neq \mu F_{tp}$$

Where μF_{te} represented the mean of F_{te} (expectation) scores and μF_{tp} represented the mean of F_{tp} (perception) scores for passengers.

In the hypothesis setout above, the differences between the means of expectation and those of perception scores were statically significant in overall employees (p= 0.0021), tangibles (p=0.0012), reliability (p=0.004), and flight pattern (p=0.008). These figures are shown in table 7.4.This indicates that the gaps occurring in dimensions highlight particular factors that cause dissatisfaction among passengers since the negative values reflect higher in expectations rather than perceptions in the SERVQUAL models.

One important finding involves the most and the least important expectation dimensions. Even though reliability appeared as the top priority in some previous studies, the 'Empathy' factor, with the satisfaction value of 6.25, was ranked as the highest expectation, and was followed by 'Availability' factor, which was ranked the second highest expectation with 6.18 linkert point. The least important expectation dimension was found to be 'Employees' with 5.21 as the mean values in table 7.4. This indicates that passengers areclearly concerned about their needs and understanding of code-sharing than the core services such as baggage check-in or convenient flight time. Furthermore, the difference between the means of expectation and perception score of 'Availability' factor which includes availability of global alliance partner's network, availability of loyalty program, and availability of frequent flyer program, are positive. This means that passengers are actually satisfied with alliance point of view.

H2. Service quality gaps of airline passengers vary by their past experiences.

In order to analyze the impact of passengers' past experience on overall assessment (H2), the hypothesis was conducted as given below:

$H_0 : \mu_1 = \mu_2$

H_1 : at least one average gap for past experience is different

Where μ values are the average gaps for the passengers who 'used to fly on code share flight (μ_1)' and passengers who 'never fly on code share flight before (μ_2)' respectively. ANOVA was used in the analysis of differences within groups. Table 5 shows significant differences in 'Empathy' ($p=0.009$), 'Availability' ($p=0.001$), 'Tangibles' ($p=0.021$), 'Responsibility' ($p=0.049$), and 'Reliability and assurance' ($p=0.002$).

In addition, analysis was also done to observe whether any past experiences on code sharing flight could cause changes on their expectation, perception and overall assessment respectively. The results showed that passengers' experience have a higher satisfaction rate for 'Empathy' with gap = 0.11, 'Employees' at 0.13, 'Tangibles' at 0.32, 'Responsibility' at 0.14, and 'Reliability and assurance' at the rate of 0.04. All gaps had positive values, meaning that their perception mean was higher than that of expectation. Next, the code-sharing experienced had a lower overall assessments for 'Availability' at 0.02 and 'Flight patterns' was given a negative value at -0.14. Consequently, persons with experience find that alliance profitability is important, but they still do not feel that direct flight or convenience flight schedules are provided through each airlines' code-sharing strategy and respond to their needs.

On the other hand, results for passengers without code-sharing experience or non user, show that they still have wrong expectation on the service in several factors such as 'Empathy', gap = -0.93, and 'Employees' at -0.53. The results indicates that passengers overly expect, especially on the quality of airlines' employees, their individual attention, understanding on ones' need, knowledge, as well as tidiness of employees. The results from 'Tangible' (-0.66) item suggest that passengers also have over expectation regarding aircraft interior, cleanliness, food and beverage. Finally, the 'Reliability' gap provides consistent result with negative value at -0.23.

At the same time, passengers with their first code-sharing experience enjoy the benefits of more direct flights and convenient flight schedules, since the perception and expectation gaps come out to be positive. Overall, passengers are happy with alliance loyalty programs such as mileage. Airline is a part of their prefer alliance since the perception value isgreatly higher than their expectation. This shows that an airline is in the right tract for building up customers' loyalty by introducing a mileage program.

In general, the results above indicate that passengers' past experiences are affected by their expectations and perceptions on the overall assessment of the flight.

2.3 Conclusion, limitation and further research

The highly competitive market conditions in the airline industry compel airlines to deliver code-sharing service in order to extend their network and acquire more passengers. It is also necessary for airlines to provide high-quality services to remain competitive. In doing so, airline firms must first understand the customers' needs and expectations as well as focus on how to deliver the most convenient services simultaneously. This study developed a structure to define airline service quality dimensions, including image and availability dimensions that were not presented in previous studies.

Passengers' past experience proved to be the most important reason in selecting an airline company. For airline companies, this indication shows how crucial it is to retain old and existing customers and to strengthen customer loyalty. In addition, some service quality items were found under different factors. So airlines management team need to consider the service promotion and/or service patterned depending on each group of passengers.

On the basis of the service quality gaps, the results suggested that most passengers' perception was affected by their expectations in the dimensions. This finding confirms that airline management should be more committed to performance improvement and be on the alert for improvement opportunities throughout the service delivery processes. Taking this into consideration, future research should investigate why perceptions had lower influences than expectations among passengers, and how this situation could be improved.

In the expectation section, the most important dimension was 'Empathy' while the least important one was 'Employees.' In contrast to previous studies, this highlights the expectation factors on which airline firms' marketing function should be focusing on when designing their service delivery processes. Similarly, in the perception section, 'Responsibility' took the highest score and 'Employees' had the lowest.

Passengers' past experience is an important factor since they affect both expectations and perceptions in various dimensions. In addition, passengers' gap scores significantly differed by past experience. This is a crucial finding to increase passenger satisfaction and market share in the long run. This also supports a more general observation that service policies can be perceived in different ways by individuals with different experience. In addition to the effects of their past experience and the impact of code-sharing flight also shows the importance of each customer as a unique being. That is, in order to acquire more passengers from code-sharing, each airline needs to have at least certain points of standardized service to be provided to passengers. Without such service provision, passengers will not count on code-share flight being operated by other ticketing airlines as much as they could be.

The obtained results have their limitations in terms of the sample diversity and the sampling size. First, airline distribution (Table 7.3) was not broadly symmetrical. Participants were only Star Alliance members which did not include all direct flights from all operating airlines flying from Narita to Bangkok, e.g. Northwest Airlines from Skyteam group and Japan Airlines which belonged to OneWorld alliance. For this reason, further analyses should be performed on these variables in different strategic alliances, to make comparisons among different cultural firms and note the satisfaction of various passengers in a wider manner. Another limitation of the study is that it was conducted among passengers of only one nationality. Multiple nationalities would be more preferable since the findings would contain a more generalized population across the industry. The third limitation is the small sample size for both non code-sharing users and code-sharing passengers. Despite the intention to have a larger sample size, the actual number of responses turned out to be less than the expected target sample size. The last point for future research is on the investigation of why perceptions were lower than expectations among passengers, how can this situation can be improved, and finally, what influences passengers to select an airline.

3. Analysis Two is the structural relationships indicating the effect of airline service quality on Thai passengers' behavioral intentions.

Introduction

Structural equation modeling (SEM) is a modeling technique that could handle a large number of endogenous and exogenous variables, as well as latent (unobserved) variables specified as linear combinations (weighted average) of the observed variables. An SEM structural model is used to capture the casual influences of the exogenous variables on the endogenous variables and the causal influences of endogenous variables on one another. Similarly, SEM can have a measurement model and latent variables for exogenous variables. Path analysis are special cases of SEM with observed variables, while ordinary linear regression is the special case of SEM with one observed endogenous variable and multiple observed exogenous variables.

The SEM model is suitable for this study since some studies have suggested that the measurement of consumer satisfaction should be used in conjunction with the measurement of expectation and perception gap. At the same time, overall satisfaction and ticket fare satisfaction may be a better predicator of passenger's purchase intentions while the relationship between them still remains unclear. The purpose of this section is mainly to examine the relationships between expectation and perception gap, overall service satisfaction, ticket fare satisfaction and behavioral intentions of passengers toward code sharing airline service context.

3.1 Theoretical background

When modeling passengers' decision-making process, the key variables which are normally considered include service expectation, perceived performance, perceived value, satisfaction, and behavioral intentions (Park et al., 2004).

3.1.1 Service quality

The concept of service quality as a comparison between customers' expectations and actual services performance has obtained wide acceptance following the studies of Parasuraman et al, 1991. The extensively used measure of service quality is SERVQUAL (Oh,1999), and according to the disconfirmation of expectations model (Oliver, 1980), whenever the performance exceeds the expectations, the expectation is confirmed. Despite criticism from other researchers, SERVQUAL remains the most commonly used diagnostic model for evaluating service quality and the development of service quality strategies.

3.1.2 Perceived value

The perceived value is defined as "the consumer's overall assessment of the utility of a product or service based on perceptions of what is received and what is given (Zeithaml, 1988)". Specifically, perceived value can be summarized as a trade-off between perceived benefits and perceived costs (Lovelock, 2000). Recent research studies have suggested that perceived value may be a better predictor of repurchase intentions than either satisfaction or quality (Oh, 2000). Perceived value can be analyzed with a uni-dimensional measure or a multi-dimensional scale. The problem with the former is mainly concerned with its lack of validity.

3.1.3 Satisfaction

Satisfaction is an overall response to a perceived discrepancy between prior expectation and perceived performance after consumption. It can be defined as the degree to which one believes that an experience evokes positive feelings (Rust and Oliver, 1994). In practice, service quality and satisfaction are often used interchangeably because both are evaluation variables relating to consumers' perceptions about a given product or service. In addition, service quality is related to cognitive judgments and customer satisfaction is related to affective judgments. To imply holistic evaluation after a purchase, the concept of overall satisfaction is made to distinguish from satisfaction with individual attributes (Bitner and Hubert,1994). Overall satisfaction refers to the customer's overall subjective post-consumption evaluation judgment based on all encounters and experiences with a particular organization. The concept of overall satisfaction was adopted in this study because finding only gap of expectation and perception is insufficient to observe overall service received by passengers.

3.1.4 Relationship between the variables

Research studies have established the antecedent, mediating, and consequent relationships among customer perceptions of service quality, customer satisfaction, customer value and post-purchase behavioral intensions. More specifically, in the context of airline service, the importance of the relationships between all these variables has been examined by some studies (Ostrowski et al, 1993, Park et al, 2004).

Past studies have suggested that service quality directly and significantly influences satisfaction (Caruana et al, 2000) or perceived value (Zeithaml, 1988). Since perceived service quality reflects customers' expectations and the actual performance, the lower expectation or the higher perceived performance is more likely to lead to a better perceived service quality. Hence, it is reasonable to hypothesize that expectations directly and negatively influence both satisfaction and perceived value, while perceived performances directly and positively influence both satisfaction and perceived value. In addition, the relationship of perceived value on customer overall satisfaction was supported by Cronin et al, 2000 research. Both satisfaction and perceived value are direct behavioral intentions. (Cronin et al, 2000). In this research, behavioral intention consists of two items, repurchase intention and recommendation intention. Based on the review of the aforementioned prior studies, the conceptual model is proposed.

3.2 Hypothesis and research method

H1: Service gap has a positive influence on passenger satisfaction

H2: Overall satisfaction has a positive influence on purchase intention

H3: Overall satisfaction has a positive influence on fare

H4: Fare has positive influence on purchase intention

3.2.1 Research method

The questions in the questionnaire are based on first section of this chapter. The first part (Part1) of the questionnaire dealt with the measurement of service quality. Respondents were asked to indicate the expectation importance of each attribute via a 7-point likert scale. Similarly, the perceived performance for each attribute was also rated.

The second part (Part 2) dealt with the measurement of perceived value with two items through a 7-point likert scale from "extremely disagree (=1) to extremely agree (=7)."

Part 3 dealt with the measurement of single item overall satisfaction and two item behavioral intentions through a 7-point likert scale from "1=extremely disagree (unlikely) to 7=extremely agree (likely)."

Part 4 of the survey collected respondents' demographic information

3.3 Analysis of SEM and findings

In order to estimate the proposed structural equation model (SEM), questionnaires regarding the measurement variables in Table 1 were distributed. All variables were measured based on the seven-point Likert scale. Out of the 315 questionnaires returned and utilized in the previous section, only 297 were valid for this research after eliminating missing values. For the fare dimension in the structural equation model, overall satisfaction and purchase intention were latent variables, while the attributes of the service dimension were measurement variables. In order to ensure the relationship for the measurement variables and latent factor as shown in table 7.7, a confirmatory factor analysis was performed before fitting to the SEM as given in figure 7.1. The Cronbach's alpha test confirmed the relation between the observed questionnaire variables and the factors set in Table 7.7 at a reliability level of 0.75 for model 1, or base model, the model which does not include expectation and perception gap, and 0.65 for model 2, full model. Both models have Cronbach's alpha of over 0.64, revealing high reliability of measurements. Furthermore, all loading scores factors were higher than 0.5, indicating acceptable validity level. In the conclusion section of measurements, the mean was then taken for each multivariate construct.

This study examined GFI (Goodness of Fit Index) and AGFI (Adjusted Goodness of Fit Index). Generally, GFI and AGFI have been used as representative indexes to verify the reliability and validity of a model in Structural Equation Model. This is similar in character to the R2 values of the regression analysis and RMR. By analyzing the ride comfort model using SEM, the fitness indexes shown in table 7.8 were generated. The result showed that both models were significant. As for the fitness indexes, the indexes of GFI (0.913) and AGFI (0.921) for model 1 had values that were of significant level. On the other hand, in model 2, GFI (0.897) and AGFI (0.899) values were very close to the significant level, for GFI and AGFI > 0.9. RMSEA (0.0501) for model 1 also fell within the significant range of RMSEA = 0.0489, while it was close to significant range for model 2.

Table 7.8 and 7.9 summarizes the results of the hypotheses testing. Three hypotheses are tested for model 1. One of them is found to be rejected, namely the relationships between fare satisfaction and purchase intention (H3). The others are found to be supportive. As hypothesized, the overall satisfaction has a significant positive influence on purchase intention and fare. In contrast to model1 the model 2 included gap of expectation and perception in term of latent variable in order to test the relationship between them. In this model, ten hypotheses were tested. Four of which were rejected, namely the relationships between assurance and overall satisfaction (H2), reliability and overall satisfaction (H3), employee’s outlook and overall satisfaction and lastly (H5), the relationship of fare and purchase intention (H10).

As shown in figure 7.3 and table 7.9, variables that were defined as the ‘responsiveness’ most positively affected customer satisfaction. The result shows that passenger really consider their travel satisfaction on service they received from flight attendants or ground crews. Secondly, variables defined as ‘Alliance’ is shown to be the second most positive effect on customer satisfaction. These results confirm the right track of the alliance benefit and how passengers rate the alliance benefit. On the contrary, the factors name ‘flight’, ‘more direct route’ and ‘gives convenience flight schedule’ which are mainly the benefits of code sharing flight, are shown to have less positive effect on their satisfaction. This implies that code sharing benefits do not gain much from passenger satisfaction. At the same time, the ‘facility’ variable was found to have negative effect on satisfaction. Surprisingly, passengers may not feel the difference between waiting lounge and entertainment and/ or even comfortable seat or seat pitch since the survey is mostly on medium haul flights.

At the same time, ‘satisfaction’ has very strong positive effects on ‘purchase intention.’ This was not a surprising result, since passengers will tend to re-purchase as well as recommend the airline to their family and friends if they are satisfied with the code-sharing services. In addition, the relationship between ‘satisfaction’ factor and ‘fare’ are very strong. If passengers are satisfied with the service, they seem to be happy with the ticket fare they purchase. On the other hand, it could not be implied that passengers who are satisfied with ‘fare’ factors would re-purchase code share flight again since the path estimate coefficient is very small for those two factors.

3.4 Conclusion, discussion, limitation and future research

The SEM technique was used to distinguish variables that affected passenger satisfaction and purchase intention. The results of the analysis, which indicated the suitability of the code sharing service model for each path based on several factors, were significant at the confidence level of 90%. The results of the study also indicated that subjective responses, safety, mileage program, and a good loyalty program affected the improvement of passenger satisfaction significantly. These top priority areas should be improved in order to achieve passengers' satisfaction and purchase intention. This includes improving their mileage program along with the individual services, while safety is still considered the most important factor.

This study investigated the rare concept of code sharing flight passengers' service experience and satisfaction, fare, and purchasing intention. A relatively simple SEM model was developed and proved statistically to ensure clearer observation of the relationships between various variables of passenger's thought towards code sharing flight. The SEM approach not only verified the hypotheses and measured degree of effect through path coefficients, but it also analyzed the explicating factors for overall satisfaction.

Although there is a clear limitation in using the model of this study in other applications, the approach to passenger code sharing satisfaction model used in this study is still useful to many airline alliance applications that will be introduced in the near future. This study still left an interesting topic to further investigate on, which is the result comparison of different studies conducted on passengers with other nationalities than Thai or even in different alliance groups.

Table 5.1 Descriptive data (in percentage for total of 315 respondents)

(%)	All Nippon Airlines	United Airlines	Thai Airways	Total
Sex				
Male	58.8	48.5	53.2	53.3
Female	41.8	51.5	46.8	46.7
Age				
Below 20	3.7	4.4	4.2	4.1
21-30	36.1	33.2	24.9	31.4
31-40	28.3	28.3	31.0	29.2
41-50	20.4	19.6	22.6	20.8
51-60	8.5	11.7	13.0	11.1
61 and above	2.5	2.8	4.3	3.2
Job				
Students	9.1	13.4	6.3	9.6
State Employee	18.7	12.5	6.6	15.9
Private Employee	26.7	28.9	22.2	25.9
Business Owner	29.5	25.6	28.5	27.8
State Enterprise Employee	3.5	3.0	5.7	4.0
Not Employed/Retired	6.7	7.4	9.2	7.8
Daily Worker	2.2	2.7	5.1	3.3
Others	2.6	6.5	6.4	5.2
Household monthly income (Bath)				
Below 20,000	9.2	11.8	7.9	9.6
20,001-40,000	27.0	30.2	21.7	26.3
40,001-60,000	17.8	19.6	18.1	18.5
60,001-80,000	12.0	11.2	11.1	21.4
80,001-100,000	8.1	9.0	12.4	9.8

(%)	All Nippon Airlines	United Airlines	Thai Airways	Total
More than 100,000	25.9	18.2	28.8	24.3
Place of Ticketing				
Airline sell office	16.5	21.5	35.4	24.5
Agency	81.4	73.9	60.2	71.8
Internet	2.1	4.6	4.4	3.7
International travel frequency (roundtrip per year)				
Less than 3	27.4	36.3	47.5	37
4-6	44.3	32.4	28.2	34.9
7-9	23.4	21.2	16.4	20.3
More than 9 times	4.9	10.1	7.9	7.6
Class of service				
Business Class and above	11.2	17.5	32.1	20.2
Economy Class	88.8	79.5	7.6	78.6
Alliance membership				
Gold member	13.4	22.3	25.6	20.4
Silver member	32.7	33.1	38.9	34.9
General member	48.8	37.8	31.7	3.8
Not a member	20.4	34.9	39.4	5.2
Purpose of Travel				
Business	27.7	27.7	34.9	30.1
Personnel	27.9	22.5	20.9	23.7
Leisure	27.2	31.7	23.9	27.6
Return Home	15.1	17.8	19.3	17.4
Others	2.1	0.3	1	1.1
Decision maker				
Yourself	36.8	29.7	44.2	36.9
Travel Agency	42.7	38.5	32.7	37.9

(%)	All Nippon Airlines	United Airlines	Thai Airways	Total
Secretary	17.2	21.2	22.5	20.3
Others	3.3	10.6	0.6	4.8
Experience on Code-share flight				
Yes	27.4	39.5	22.1	29.6
No	72.6	60.5	77.9	70.3
Code-sharing flight time known				
Before buying ticket	21	34	18	24.3
At ticketing	24	18	21	21
At Check in	39	34	44	39
When boarding the aircraft	15	12	15	14
Do not know	1	2	2	1.6

Table 5.2 Principle component analysis loading for all questions

Items and factors	factor1	factor2	factor3	factor4	factor5	factor6	factor7	internal consistency
empathy								0.68
individual attention to passengers	0.767							
understanding of passengers' specific needs	0.642							
availability of air/accommodation packages	0.538							
availability of travel related partners	0.512							
Availability								0.71
availability of global alliance partners' network		0.693						
availability of loyalty program		0.653						
availability of frequent flyer program		0.483						
Employees								0.75
Behavior of employees gives confidence			0.825					
courteous employees			0.672					
employees have knowledge			0.618					
neat and tidy employees			0.594					
Tangibles								0.79
clean and comfortable interior/seat				0.718				
food and beverage				0.691				
In flight entertainment facilities and programming				0.654				
availability of waiting lounge				0.579				
In flight internet/email/fax/phone/facilities				0.545				
Responsiveness								0.72
Efficient check in/baggage handling					0.753			
Employees are always willing to help					0.672			
employees handle requests/complaints promptly					0.632			
prompt service by employees					0.613			
Reliability and assurance								0.65
On-time departure and arrival						0.779		
Safety						0.766		
consistent ground/in flight services						0.579		
perform service right the first time						0.545		
Flight Pattern								0.72
convenient flight schedules and enough frequencies							0.738	
non-stop flights to various destinations							0.611	

Eigen Values	2.643	3.134	1.145	2.214	4.632	1.276	1.434
% of variance	7.31	12.79	2.52	6.92	15.26	3.98	4.75

Table 5.3 Expectation, Perception and the gap of all questions

Items and factors	Expectation mean	Perceptions mean	Gap
empathy			
individual attention to passengers	6.41	5.42	-0.99
understanding of passengers' specific needs	6.39	6.22	-0.17
availability of air/accommodation packages	2.21	2.23	0.02
availability of travel related partners ex. Hotel/rental car	3.20	3.17	-0.03
Availability			
availability of global alliance partners' network	5.53	6.12	0.59
availability of loyalty program	6.23	6.17	-0.06
availability of frequent flyer program	6.19	6.02	-0.17
Employees			
Behavior of employees gives confidence	5.61	5.42	-0.19
courteous employees	4.09	4.13	0.04
employees have knowledge	5.29	5.17	-0.12
neat and tidy employees	4.85	5.01	0.16
Tangibles			
food and beverage	5.53	4.98	-0.55
In flight entertainment facilities and programming	4.90	5.01	0.11
clean and comfortable interior/seat	4.68	4.58	-0.10
availability of waiting lounge	4.71	4.84	0.13
In flight internet/email/fax/phone/facilities	3.20	3.24	0.04
Responsiveness			
Efficient check in/baggage handling	5.12	6.13	1.01
Employees are always willing to help	5.32	5.86	0.54
employees handle requests/complaints promptly	5.25	4.34	-0.91
prompt service by employees	6.23	6.19	-0.04
Reliability and assurance			
On-time departure and arrival	6.21	6.19	-0.02
Safety	6.68	6.52	-0.16
consistent ground/in flight services	4.54	4.67	0.13
perform service right the first time	4.83	4.56	-0.27
Flight Pattern			
convenient flight schedules and enough frequencies	5.67	5.86	0.19
non-stop flights to various destinations	5.32	5.56	0.24

Table 5.4 Gaps between expectations and perceptions on mean scores of each factor

Factors	items	N	Mean	SD	Gaps	(p values)
Empathy	Expectation	315	6.25	2.099	-0.22	0.076
	Perception	315	6.03	2.214		
Availability	Expectation	315	6.18	1.315	0.07	0.231
	Perception	315	6.25	1.209		
Employees	Expectation	315	5.21	1.395	-0.16	0.0021 **
	Perception	315	5.05	1.376		
Tangibles	Expectation	315	5.49	2.493	-0.17	0.0012**
	Perception	315	5.32	3.023		
Responsibility	Expectation	315	6.03	1.825	0.40	0.102
	Perception	315	6.43	2.293		
Reliability and assurance	Expectation	315	5.31	1.167	-0.02	0.004 **
	Perception	315	5.29	1.704		
Flight Patterns	Expectation	315	5.34	1.256	-0.02	0.008 **
	Perception	315	5.32	1.823		

** is significant at 0.05

Table 5.5 Gaps between expectations and perceptions on mean scores of each factor depending on past code-sharing experience

Factors	use code-share before	expectations				perceptions				Gaps			
		N	mean	SD	p	N	mean	SD	p	N	mean	SD	p
Empathy	yes	93	6.01	1.888	0.004**	93	6.12	1.18	0.014**	93	0.11	1.024	0.009**
	not	222	6.21	1.078		222	5.28	1.259		222	-0.93	1.356	
Availability	yes	93	6.77	0.696	0.001**	93	6.75	0.365	0.006**	93	-0.02	0.532	0.001**
	not	222	5.26	0.177		222	6.02	0.52		222	0.76	0.659	
Employees	yes	93	5.23	0.149	0.036**	93	5.36	0.424	0.124	93	0.13	0.512	0.056
	not	222	5.74	0.632		222	5.21	0.55		222	-0.53	0.693	
Tangibles	yes	93	5.89	0.775	0.032**	93	6.21	0.517	0.021**	93	0.32	0.417	0.021**
	not	222	5.92	0.437		222	5.26	0.622		222	-0.66	0.673	
Responsibility	yes	93	5.78	0.996	0.068	93	5.92	0.974	0.038**	93	0.14	0.975	0.049**
	not	222	5.42	1.329		222	5.51	1.049		222	0.09	1.023	
Reliability	yes	93	5.21	1.130	0.007**	93	5.25	1.683	0.003**	93	0.04	1.521	0.002**
and assurance	not	222	5.97	1.851		222	5.74	1.306		222	-0.23	1.562	
Flight Patterns	yes	93	6.01	0.888	0.147	93	5.87	0.633	0.072	93	-0.14	0.245	0.116
	not	222	5.48	0.386		222	5.56	0.515		222	0.08	0.527	

** is significant at 0.05

Figure 5.1 Proposed passengers' code sharing flight service satisfaction model

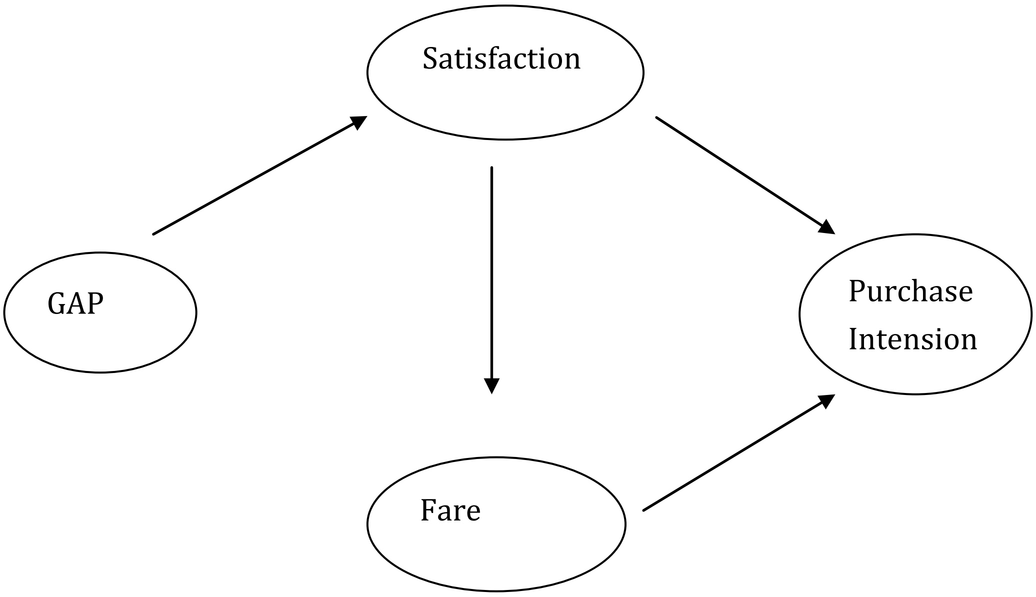


Table 5.6 Measurement variables for latent factors and confirmatory factor analysis

Measurement variables	Latent variables						
	Responsiveness	Assurance	Reliability	Facility	Employee	Flight	Alliance
Employees gives prompt service	0.805						
Employees is too busy to response	0.742						
Employees is willing to help	0.681						
Efficient Check-in and baggage	0.380						
Employees has enough knowledge		0.830					
Feel safe on the flight		0.801					
Employees gives confidence		0.747					
On time performance			0.865				
Service consistency			0.634				
Service right at the first time			0.587				
Provide good food and drink			0.570				
Up to date entertainment				0.875			
Clean and comfortable seat				0.635			
Comfortable waiting lounge				0.601			
In-flight internet, phone, fax					0.675		
Employees is courteous					0.624		
Employees is neat and tidy					0.537		
More direct route						0.781	
Good flight schedule and timing						0.736	
Global alliance							0.902
Mileage program							0.864
Good royalty program							0.785

Table 5.7 Fit statistics for SEM

Index (Category)	Results		Remarks
	Model 1	Model2	
Minimum fit function Chi-Square	225.264 (p=0.0)	323.436 (p=0.0)	Model acceptance
Normal theory weighted Least square Chi-square	298.153 (p=0.0)	354.624 (p=0.0)	Path acceptance
Estimated non-centrally Parameter (NCP)	231.523	298.532	
Goodness of Fit Index (GFI)	0.913	0.897	If GFI > 0.9, accept
Adjust Goodness of Fit Index (AGFI)	0.921	0.899	If AGFI > 0.9, accept
Root Mean Square Residual (RMR)	0.057	0.065	
Normed Fit Index (NFI)	0.957	0.902	If NFI >0.9, accept
Non-Normed Fit Index (NNFI)	0.876	0.786	
Root Mean Square Error of Approximation (RMSEA)	0.0501	0.0489	If RMSEA < 0.05, accept

Table 5.8 Verification of the proposed model 1 hypothesis

Hypothesis	Estimate	t-values	Remarks
H1; Overall satisfaction has a positive influence on purchase intention	0.65	2.046**	Accept
H2; Overall satisfaction has a positive influence on Fare	0.67	2.853**	Accept
H3; Fare has positive influence on Purchase intention	0.18	0.835	Reject

Table 5.9 Verification of the proposed model 2 hypothesis

Hypothesis	Estimate	t-values	Remarks
H1; Responsiveness factor will have positive effect on Satisfaction	0.22	4.736**	Accept
H2; Assurance factors will have positive effect on Satisfaction	0.12	2.423**	Reject
H3; Reliability factors will have positive effect on Satisfaction	0.13	0.654	Reject
H4; Facility factors will have positive effect on Satisfaction	-0.11	2.456**	Accept
H5; Employee factors will have positive effect on Satisfaction	-0.08	1.783	Reject
H6; Flight Pattern factors will have positive effect on Satisfaction	0.05	3.179**	Accept
H7; Alliance factors will have positive effect on Satisfaction	0.20	2.224*	Accept
H8; Overall satisfaction has a positive influence on purchase intention	0.73	4.231**	Accept
H9; Overall satisfaction has a positive influence on Fare	0.64	3.433**	Accept
H10; Fare has positive influence on Purchase intention	0.09	1.432	Reject

Figure 5.2 Results of testing the hypothetical model 1

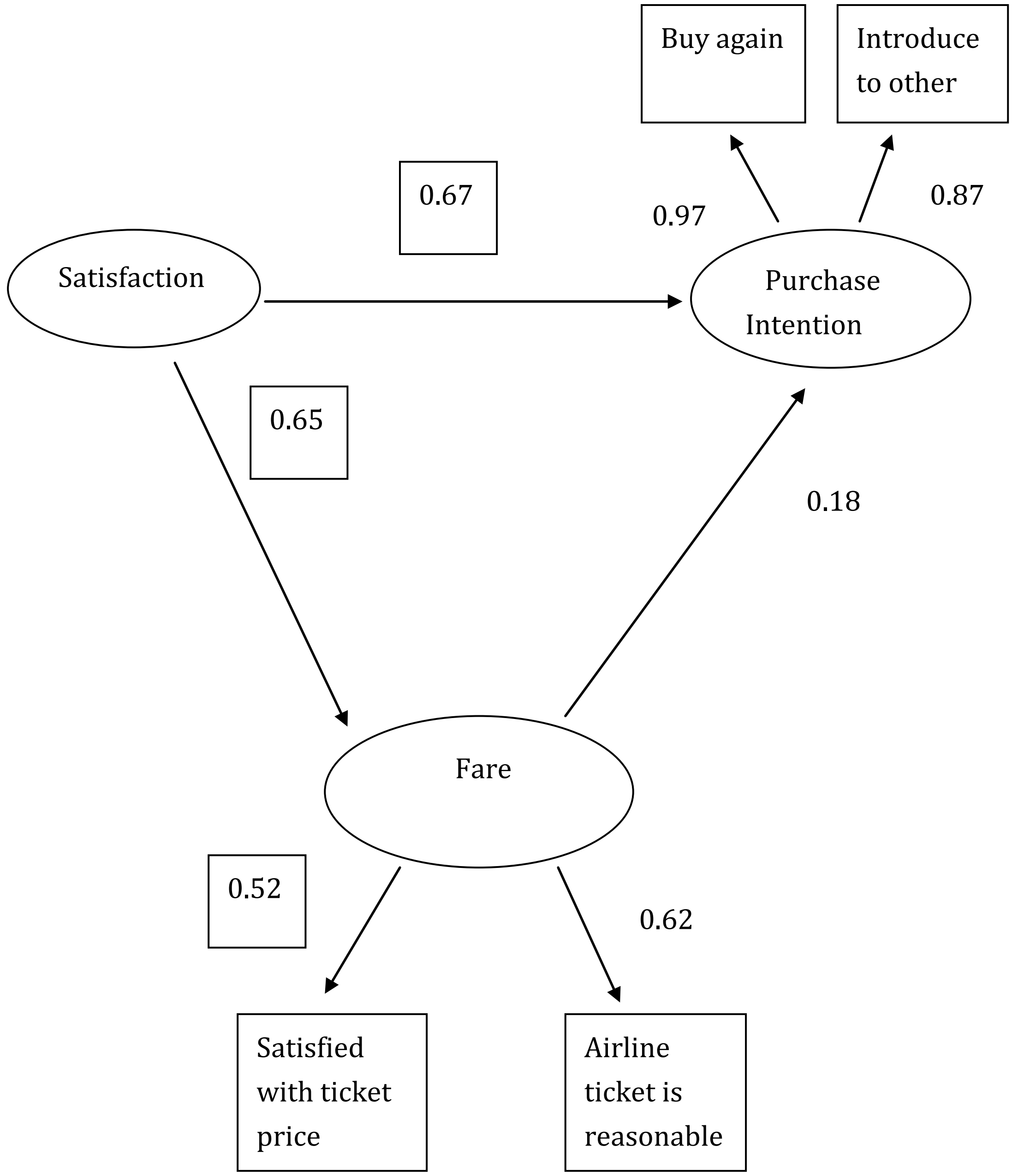
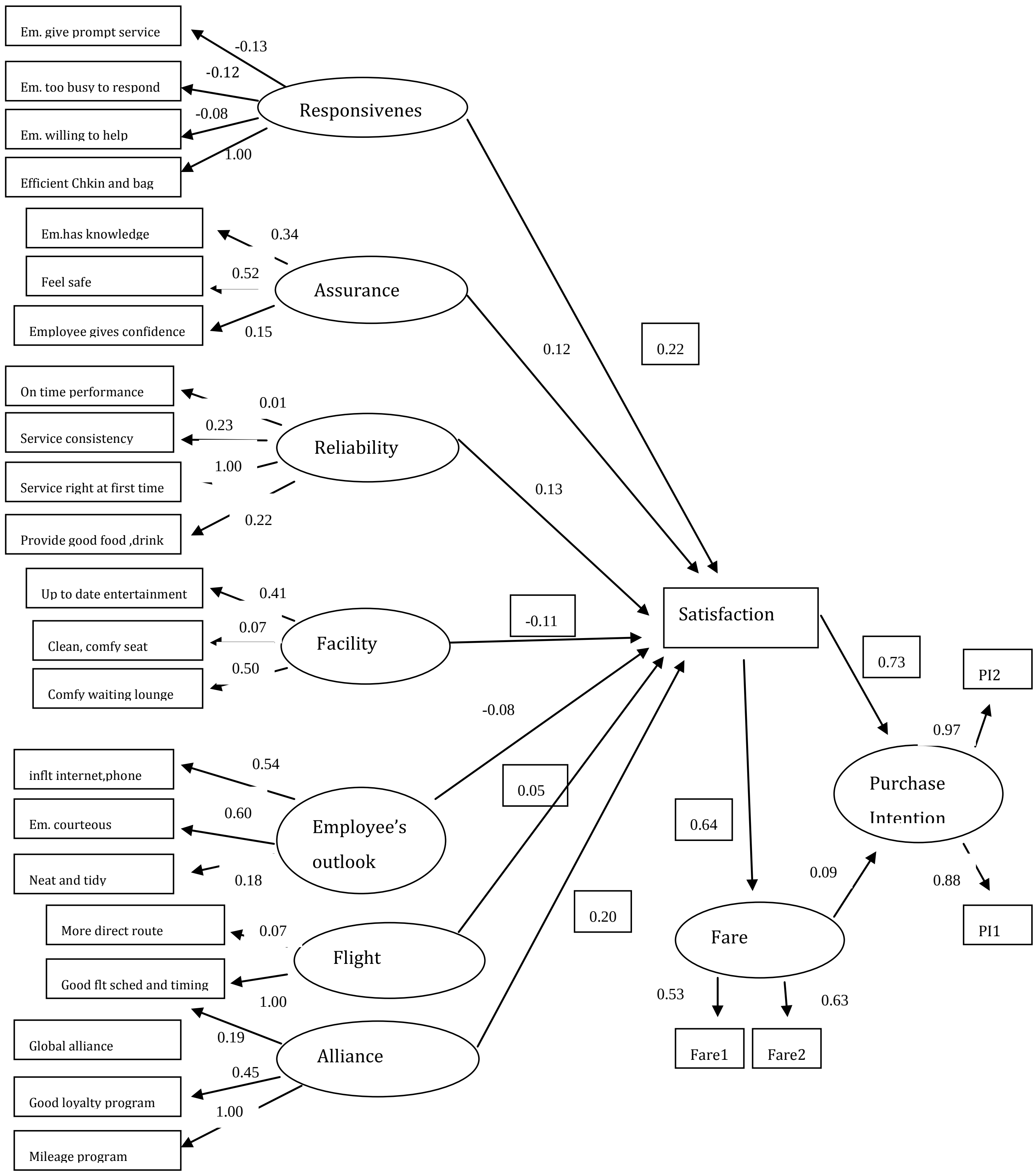


Figure 5.3 Results of testing the hypothetical model 2



Appendix D: Question of part one, two and three

1	the flight departs and arrives at a time it promises
2	the airline provides good ground/in flight services consistently
3	The airline performs the service right at the first time
4	the airline provides quality food and beverage
5	the behavior of employees gives you confidence
6	the airline makes you feel safe
7	employees of the airline have the knowledge to answer your question
8	the aircraft has clean and comfortable interiors and seats
9	the airline has up to date in-flight entertainment facilities and programs
10	the airline has comfortable waiting lounges
11	the airline provides in-flight internet/email/fax/phone services
12	employees of the airline are consistently courteous with you
13	employees of the airline appear neat and tidy
14	the airline has nonstop service to various destinations
15	the airline had convenient flight schedules and enough frequencies
16	the airline has global alliance partners in order to provide a wider network and smoother transfers
17	employees of the airline understand your specific needs
18	the airline has a sound loyalty program to recognize you as a frequent customer
19	the airline has a mileage program
20	employees of the airline give you prompt service
21	the airline has efficient check-in and baggage handling services
22	employees of the airline are always willing to help you
23	employees of the airline are never too busy to respond to your request or complaint

Questionnaires

1. Sex

   O Man O Woman

2. Age

   O Under 20 O 21-30 O 31-40

   O 41-50 O 51-60 O 61 and above

3. Status

   O Single O Married number of kids ________ person

4. Job

   O Students O State Employee O Private Employee

   O Business Owner O State Enterprise Employee

   O Daily Worker O Not Employed/Retired O Others______________

5. Average income per month

   O Below 20,000 bath O 20,001 – 40,000 bath

   O 40,001 – 60,000 bath O 60,001 – 80,000 bath

   O 80,001 – 100,000 bath O More than 100,000 bath

6. Place of ticketing

   O Internet O Travel agent O Airline office

7. International flight (round trip) you fly within 1 year

   O Less than 3 O 4-6 O 7-9 O More than 9

8. Ticketing airline

   O TG flight number ____

   O NH flight number ____

   O UA flight number____

9. Class of service

O Business and above O Economy

10. Alliance membership

O Gold O Silver O General member O not a member

11. Purpose of travel

O Business O Personnel O Leisure O Return Home O Others

12. Decision maker

O Yourself O Travel Agency O Secretary O Others

13. Experience of Code-Share flight

O Yes O No

14. Code-sharing flight time known

O Before buying ticket

O At ticketing

O At Check-in

O When boarding the aircraft

O Do not know

Expectations

Based on your experiences and expectations, please rate how important the following service attributes are to you when you choose an airline. The score 7 represents that the attribute is very important, and the score 1 means that the attribute is not important at all. There are no correct answers. The score you circle or tick should truly reflect your feelings about the relative importance of airline services that would affect your airline choice.

	Not important			---------------Neutral------------			Very important
1. Individual attention to passengers	1	2	3	4	5	6	7
2. Understanding of passengers' specific needs	1	2	3	4	5	6	7
3. Availability of air/accommodation packages	1	2	3	4	5	6	7
4. Availability of travel related partners	1	2	3	4	5	6	7
5. Availability of global alliance partners' network	1	2	3	4	5	6	7
6. Availability of loyalty program	1	2	3	4	5	6	7
7. Availability of frequent flyer program	1	2	3	4	5	6	7
8. Behavior of employees gives confidence	1	2	3	4	5	6	7
9. Courteous employees	1	2	3	4	5	6	7
10. Employees have knowledge	1	2	3	4	5	6	7
11. Neat and tidy employees	1	2	3	4	5	6	7
12. Clean and comfortable interior/seat	1	2	3	4	5	6	7
13. Food and beverage	1	2	3	4	5	6	7
14. In flight entertainment facilities and programming	1	2	3	4	5	6	7
15. Availability of waiting lounge	1	2	3	4	5	6	7
16. In flight internet/email/fax/phone/facilities	1	2	3	4	5	6	7
17. Efficient check in/baggage handling	1	2	3	4	5	6	7
18. Employees are always willing to help	1	2	3	4	5	6	7
19. Employees handle requests/complaints promptly	1	2	3	4	5	6	7
20. Prompt service by employees	1	2	3	4	5	6	7

21. On-time departure and arrival	1	2	3	4	5	6	7
22. Safety	1	2	3	4	5	6	7
23. Consistent ground/in flight services	1	2	3	4	5	6	7
24. Perform service right at the first time	1	2	3	4	5	6	7
25. Convenient flight schedules and enough frequencies	1	2	3	4	5	6	7
26. Non-stop flights to various destinations	1	2	3	4	5	6	7

Perceptions

Based on your experiences and perceptions with the service of the airline on your previous flight(s), please rate the quality level in terms of the following service attributes. The score you circle or tick should truly reflect your feeling about the extent to which the airline service satisfies you. The score 7 represents that you are extremely satisfied with the service for the attribute, and the score 1 means that you are totally dissatisfied with the service for the attribute.

	Not Very important --------Neutral -----------important						
1. Individual attention to passengers	1	2	3	4	5	6	7
2. Understanding of passengers' specific needs	1	2	3	4	5	6	7
3. Availability of air/accommodation packages	1	2	3	4	5	6	7
4. Availability of travel related partners	1	2	3	4	5	6	7
5. Availability of global alliance partners' network	1	2	3	4	5	6	7
6. Availability of loyalty program	1	2	3	4	5	6	7
7. Availability of frequent flyer program	1	2	3	4	5	6	7
8. Behavior of employees gives confidence	1	2	3	4	5	6	7
9. Courteous employees	1	2	3	4	5	6	7
10. Employees have knowledge	1	2	3	4	5	6	7
11. Neat and tidy employees	1	2	3	4	5	6	7
12. Clean and comfortable interior/seat	1	2	3	4	5	6	7
13. Food and beverage	1	2	3	4	5	6	7
14. In flight entertainment facilities and programming	1	2	3	4	5	6	7
15. Availability of waiting lounge	1	2	3	4	5	6	7
16. In flight internet/email/fax/phone/facilities	1	2	3	4	5	6	7
17. Efficient check in/baggage handling	1	2	3	4	5	6	7
18. Employees are always willing to help	1	2	3	4	5	6	7
19. Employees handle requests/complaints promptly	1	2	3	4	5	6	7
20. Prompt service by employees	1	2	3	4	5	6	7
21. On-time departure and arrival	1	2	3	4	5	6	7
22. Safety	1	2	3	4	5	6	7

23. Consistent ground/in flight services	1	2	3	4	5	6	7
24. Perform service right at the first time	1	2	3	4	5	6	7
25. Convenient flight schedules and enough frequencies	1	2	3	4	5	6	7
26. Non-stop flights to various destinations	1	2	3	4	5	6	7

The questions for part 2, part 3 and part 4 are listed below

measures	Items
Perceived value	Considering the ticket price I pay, I believe that the airline offers sufficient services. The ticket price of this airline is reasonable
Overall satisfaction	Overall, how satisfied are you with the airline’s service?
Behavioral intentions	The likelihood that you will code-share flight again in the future? The likelihood that you would recommend the code-share flight to other people?

Chapter 6

Conclusion, implication, limitation and future research

Introduction

The purpose of this study is to gain a deeper understanding of the factors that can help airlines achieve sustainable success in the extremely tough industry. The findings are based on a detailed study of the strategy and organizational features of a company that has achieved just that. Some strategic lessons from the study that can be applied to any company that wants to achieve competitive differentiation are outlined. The aim is not to provide the solution but rather to suggest useful strategic principles and to help airlines ask the right questions, which are the only approach to effective strategic thinking.

The concept of airline alliance is not new. Alliances were first seen around 1980s in the US domestic market between major jet and commuter operators for the purpose of jointly developing the market. Alliance activity, however, witnessed significant growth during the 1980s and 1990s as a response to the pressures of globalization. Faced with two requirements of building a global presence and achieving a more efficient cost structure, and yet constrained from undertaking mergers or starting new airlines in foreign markets, airlines found alliances to be a logical strategic alternative.

Alliance is a broad term which includes a variety of inter-firm cooperation and coordination ranging from formal cooperation through equity ownership in a partner to informal coordination through frequent flyer programs.

The estimation of alliance activities varies across studies because, firstly, alliances are dynamic and airlines may be continually forming new ones as well as disbanding old ones. Secondly, the definition of alliances varies. The Airline Business Journal excludes frequent flyer program coordination unless it is part of a broad alliance agreement. Thirdly, the coverage of individual surveys might again vary. According to The Economist, there were 401 alliances in 1995, which was double the number it estimated four years earlier.

Most of the studies on this topic did, however, arrive at similar conclusions, especially regarding the following trends: that the number of alliances has been growing with a significant acceleration observed in the early 1990s; that an increasingly larger proportion of alliances are informal (non-equity) rather than formal (equity); and that a large proportion of alliances are international rather than domestic.

Alliances can take several different forms. Purchasing equity stakes (short of the levels required for a full acquisition) in another airline is a common alliance strategy that was especially popular in the 1980s and early 1990s. Equity alliances have proved to be especially attractive for international partnerships since full mergers, especially by foreign airlines, are forbidden by many host governments. Equity alliances themselves serve a variety of purposes. They may be used to shore up a struggling partner, as in the case of KLM’s cash infusion into Northwest Airlines in 1989.

A second form of arrangement is that of marketing alliances, which typically involve coordination of schedules, sharing of codes for international flights and also block space agreement. They can have a narrow (e.g. single route) or broad scope (e.g. network-wide). Code Sharing, which means that a single flight bears the codes for two or more airlines, can give the appearance of a seamless single-carrier flight to the customer. British Airways was able to extend its reach into many of US cities by code sharing with American Airlines. According to a United Airline manager, 'The profits on offer through route-sharing are something most airlines could never hope to achieve by themselves. Block space agreement, another type of marketing alliances, involves one airline committing itself to buying a certain number of seats on its partner's flights. If the volume of demand for the airline buying the seats is insufficient for it to operate a flight, a block-space agreement is likely to lead to cost savings. The airline that sells the seats also benefits from the higher load factor. This arrangement is useful, especially for airlines that do not have the freedoms to fly particular routes, as in Delta's block-space agreements for Virgin flights between European cities and the United States and also Air India's block-space agreements for Thai Airways flights between Bangkok and Japan, since the number of Air India passengers is not large enough to exceed the operation cost.

A third kind of airline alliance is the coordination of frequent flyer programs, which offers an airline's customers the additional benefit of earning points on a partner's flights. A typical airline might have several such agreements. Increasingly, airlines are also providing additional convenience by allowing customers to redeem miles on their partners' flights.

A strategic alliance is one where the partners co-mingle their assets in order to pursue a single or joint set of business objectives. Co-mingled assets may be terminal facilities, maintenance bases, aircraft, staff or joint purchase. If two or more airlines offer a common brand and a uniform service standard, that means they are co-mingling their assets and have moved into a strategic alliance. Conversely, many code-share agreements, joint frequent flyer program and even some block space agreements are essentially marketing alliances. They are not strategic because the partners continue to operate and use their assets independently, each pursuing their own objectives.

Another recent trend in the airline industry is the formation of large-size strategic alliances, such as the Star Alliance which involves 26 airlines. These alliances provide unprecedented global connectivity in addition to most of the benefits available to smaller alliances (e.g. economies of scale and customer conveniences, such as access to lounges). Mega alliances also benefit airlines to be in a better position on demand side and to gain passenger loyalties by expanding their networks, more advance frequent mileage programs, airport lounges availabilities, and at the same time to gain benefit such as an increase in cost cutting by larger volume joint purchases or even management cost in the supply side.

This research has been carried out within the context of the transforming of the air transport regime and strategies. In contrast with the other research point of views, the research on airline alliance development and the consequences for airline hierarchy and planning is still somewhat limited in scope. It is not clear to what extent airlines will adopt strategic alliances into their strategic eras. And also it is not clear on how managerial strategy changes in airlines will affect the airline performance and/or passenger behaviors. Neither has the issue of alliance been addressed systematically in academic studies. These issues are highly relevant from scientific and societal perspectives.

Hence, this study has the objective to assess and describe to what extent airlines have reconfigured their alliance strategy, how these strategy changes have affected the airlines' performance, and how passengers deal with the changing context of airline marketing strategic behavior. For this reason, the aim of this study can be broken down into the following research questions: First, what has been the consequence from the rearranging by airline management teams to forego their old strategies and move to new strategies such as strategic alliance? Second, to what extent have strategic alliances improved the productivity and profitability of participating firms? Third, how can strategic alliances, toward the end, be a benefit to individual passenger?

1. Effects of alliance on airline management.

This can be measured by finding the effects of alliances on airlines' productivity and profitability. Since airlines have to find strategies to improve their performance with global expansion constrained by restrictive air services agreements. Alliance has brought benefits to airlines on cost saving, new markets access, increases in load factors, yield improvement, and shared operations.

Several research projects have studied the effects of alliances on different aspects such as cost reduction, market entry, market share and profitability. Porter and Fuller (1986) argued that alliances enable firms to achieve an increase in economies of scale through joint operations so that firms can increase profitability. Also, other research has found that alliances enable firms to be more efficient and gain larger market power, resulting in higher profitability gains. Oum et al. (2004) only examined the effect of horizontal alliances on firm performance in terms of productivity and profitability. Based on panel data from 22 airlines from 1986 to1995, the study revealed that horizontal alliances have a significant contribution to productivity gains and had no significant or positive impact on profitability.

For this research, panel data are gathered from 20 airlines and their alliance partners in terms of passenger-kilometers as published in the ICAO journal Annual Report including *Traffic, Fleet and personal and Financial Data* during the period of

1990-2004. Revenue can be divided into 5 categories: schedule passenger service, schedule freight service, mail, non-schedule service and incidental service. Cost can also divided into 5 categories: labor expense, fuel, flight, ground property and other materials.

A dependent variable is productivity index, measured by the ratio of a firm's output to its input (Farrell, 1957). Firms use multiple inputs to produce multiple outputs, so comparisons of productivity over time are based on index-number procedures. For profitability index variable was measured by dividing total revenues (TR) by total input cost (TIC). This was modified from (TR-TIC)/TR, since the log-linear specification required variables to be positive. An independent variable is number of alliances, tallied by the number of existing cooperative agreements of airlines in a given year. Control variable are set to include potential impact of partner location on firm performance, firm size, average route distance and takeoff, business composition

The panel regression model was employed to test out two hypotheses. As suggested by Hausman (1978), parameters were estimated using the "within estimator" and the "generalized least squares estimator" (GLS), which is also known as the fixed-effect estimator or the random-effects estimator, respectively.

This study revealed that, in productivity side, with the control of partner airline location, distance and composition of business, airline strategic alliance has a positive significance to firm productivity. It also revealed that route distance does not have any relationship with airline productivity, while proportion of other associate business shows positive effect to productivity. For profitability, airline strategic alliance has a positive effect to airlines' profitability. Unlike the productivity, profitability can be positively significant from the route distance. This implies the a longer route could result in less cost to the airlines, which was also proved by Oum et al, 1995

The study also uncovered that strategic alliances contributed significantly to productivity gains, as well as leaving a positive impact on profitability. In addition, this study revealed that after the 9/11 incident, the productivity and profitability of airlines have shown signs of decline if compared to the performance of earlier periods.

2. Effects of alliances on travelers' perspective and their choice of carrier.

From Star Alliance, One World and Sky Team website, press release and trade publications, benefits of airline alliances from travelers' perspective includes greater network access, seamless travel, frequent flyer program benefits, priority and extended lounge access. Global alliances also emphasize access to any alliance partner lounges as benefits for the travelers with 'priority' status, offering greater access to priority benefits from all partner airlines.

In prior research, Goh and Uncle, 2003, studied theperception of Australian business travelers based on benefits of airlines alliances. The results showed that a majority was sure of the benefits but with some misconceptions. There were no major differences between competing alliancesand alliance benefits were not seen as important.

For this study, first, cross sectional surveys of 573 Thai travelers at Bangkok international airport have been used. The survey, lasted 18 working days, 8 weekends and 2 national holidays, it took place at the International departure gate & lounges, in order to obtain premier class and top tier FFP traveler inputs. Several benefits of global alliances in firm perspectives such as market access, cost reduction, airline productivity & profitability have been recognized by travelers. While, in traveler perspective, they enjoyed benefits of global alliances in greater network access, direct flight and enhanced FFP benefits, more miles accruals & redemption. Most of the Thai leisure travelers were still unclear about alliance benefits, which suggest that each alliance should do more marketing such as advertise the benefits to help travelers understand about alliance and what they will receive from the alliance. If the passanger understands more, then they will start to consider and choose their flight by considering alliances more than just ticket fare.

Next, another question is set to find about service quality expectation and satisfaction on code sharing flight. It has been suggested that delivering superior service quality is a prerequisite for success and survival in today's competitive business environment. However, some may feel price is an important aspect of demand. But for this paper, it is suggested to emphasis on improving service of code share airlines' strategies. This research focuses on the gap between customer's expectation and perception or airline service quality, and demonstrates how an airline can utilize a measure of different passengers' gap as a diagnostic tool in managing its service quality and also educate passengers' knowledge.

Here, the study used post-flight mail surveys given out at baggage claim areas between August 1st and 15th 2009, comprising of six flights per day for Thai travelers on Narita-Bangkok route, concentrating on passengers taking direct flights and buying code share tickets regardless of airlines. Finally, only 315 data sets can be used.

Using the "SERVQUAL" tool, which was developed by Gilbert and Wong (2003) by seeing from both sides by the Likert scale 7 points and the Factor Analysis to grouping all the questions, the gap between expectations and perceptions were found. The analysis statistically focuses on the differences of the means of expectation and perception score for each factor.

The results came out that safety was the top priority, while the least important priority was availability of air/hotel package. Individual attention to passengers was the most dissatisfaction, and availability of alliance network was the most satisfaction. Different means of expectation and perception scores were statistically significant overall in areas of employees, tangibles, reliability and assurance, and flight pattern.

The results suggest that passengers' expectations and perceptions of code share services were different mainly because of their past experience, flight purpose and airlines they taken. The results also showed that, for airline managerial, the partner member had to provide at least up to one standard for all airlines to prevent their customers from dissatisfaction. Also passengers needed to find more information of airline taken and further more with alliance knowledge on both pros and cons.

From structural relationships, the SEM method was applied to gauge the effect of airline service quality on Thai passengers' behavioral intentions. The result showed that the variables that were defined as 'Responsiveness' or efficient personal services had the most positively effect to customer satisfaction. In addition, variables defined as frequent flyer program's related question or mileage was the second most positively effect, which confirmed the right tract of alliance benefits and how passengers rate the benefits. Unfortunately, the factors of 'more direct route' and 'gives convenience flight schedule' that benefited from code sharing flights had less positive effect on their satisfaction. At the same time 'airport facility' variable was found to have a negative effect on satisfaction. Surprisingly, passengers may not feel any advantage on lounge services and up to date entertainment, since the survey flight was medium haul.

At the same time, passengers' satisfaction carried a very strong positive effect on 'purchase intention'. This was not a surprise result, since if passengers were satisfied with all the code sharing services, then they would tend to repurchase as well as introduce the airlines to their family and friends. In addition, there was a strong relationship between ‘satisfaction’ factors and ‘fare’. If passengers were satisfied with the services, then they would be happy with the ticket fare they purchased. But on the other hand, passengers who were satisfied with ‘fare’ factors might not repurchase code share flights, concluded from the path estimate coefficient which was very small for those two factors.

From all the studies, alliances are a vital strategy for airlines to survive and prosper in today’s competitiveness. Alliances allow airlines to gain in productivity and profitability by reducing costs, such as lounge sharing, airport facility sharing, and by introducing economy of scale in purchases. Code sharing and block spacing within an alliance also leads to an increase in flight load factor and allow the use of more economical larger-size aircrafts. Alliances also increase customer benefits in many ways such as larger networking, enhanced frequent flyer program, upgrade, and premium services. This, in turn, attracts and retains the customer base, as well as increase customer loyalty to the airlines or alliances.

Nevertheless, airlines and alliances currently need to better promote these customer benefits to the passengers. A lot of passengers still have a wrong understanding or do not see the importance of these benefits. These passengers tend to select airlines mainly based on price rather than the alliance benefits. If airlines can build up a customer loyalty, they can charge a higher price and harvest a better profit. Additionally, passengers still rate the service very high. Airlines should strongly continue enhancing their products and services, such as in-flight entertainment, food and drink, so passengers are attracted to the airline.

One disadvantage from alliances is that it reduces the market competition, in which each country government has to deal with. This, however, may not be totally true because airlines from same alliance still fly and compete on the same routes, without any code sharing.

3. Three factors that effect the bottom line of airline business

In conclusion, here is a list of three important factors that can affect the bottom line of airline business.

3.1 Cost Control

Given the difficult economics of the airline industry, cost control is one of the strategic priorities for airlines. However, many elements of airline costs, like fuel, airport charges, are uncontrollable. Hence, airlines have often focused on labor cost savings to improve results. Many airline managers erroneously assume that wage level are the sole determinant of labor costs while forgetting that productivity is the other important element of the equation. Poor productivity can translate even low wages into high labor costs. On the other hand, high productivity can lead to significant benefits for the company. An analysis of European airlines shows that there are large variations in productivity across airlines based in the same country and that productivity and the overall performance of the airline are positively correlated. Striving to improve productivity, rather than controlling wage costs, also makes sense because wage levels are significantly influenced by the context in which the airline is operating, including local laws, the level of unionization and the cost of living, and hence is less controllable.

3.2 Managing alliances

Alliances generate mixed reactions from industry executives partly because of their different degrees of success. Alliances may also be inescapable since an increasingly larger proportion of customers require global connectivity. In a world where lean cost structures may be essential to survival, airlines can also ill afford to keep performing activities where they lack economies of scale, or do not have the best-in-class skills, and must cede these activities to their alliance partners. Alliances may be particularly useful in lean times when schedule coordination, reciprocal service provision like maintenance and check-in and economies of scale through pooled purchasing are vital. Also, alliances are valuable in the sense that they have fewer hidden costs than mergers and hence would be important even in a world where there are no regulatory barriers. Mergers lead to fleet diversity, which raises a variety of costs, such as maintenance and repair costs, crew salaries and other labor costs. If mergers are financed through debt, they increase risk. Even if further dismantling of regulatory barriers makes mergers and acquisitions possible, alliances will remain an important strategic option for airlines, contrary to the belief of some industry analysts and managers.

3.3 Commoditization and customer mix

To overcome the commoditization of its service and gain customer loyalty, American Airlines launched the first frequent flyer (FFP) in 1981, and other airlines soon followed suit. Many airlines, however, were too generous in granting FFP points and in the process built up massive contingent liabilities (in the form of FFP points that may be exchanged for free travel). To contain the problem, they implemented complex restrictions on their FFP program, alienating customers in the process. It may be an opportune time for airlines to reexamine their FFP program and adopt a sensible strategy where they reward customer loyalty in a fashion that does not undermine profitability or alienate customers.

Lastly, one of the key conclusions drawn from this review is that the industry poses tremendous challenges to the incumbents, especially with regard to attaining consistent profitability. A few strategies identified by this research can help the incumbents mitigate the difficulties existing in the operating environment. These strategies include the adoption of cutting-edge technology, effective cost control and labor management, managing alliances for synergies, avoiding the herd instinct in adopting technology or purchasing new equipment, as well as avoiding commoditization of services and focusing on the appropriate customer mix.

In addition, this study is to gain a deeper understanding of the factors that can help airlines achieve sustainable success in extremely tough industries. The researchfindings are based on a detailed study of the strategy and organizational features of a company that has achieved just that. So some strategic lessons are outlined from the study that can be applied to any company that wants to achieve competitive differentiation. The research goal is not to provide solution but rather to suggest useful strategic principles and to help executives ask the right questions which are considered an efficient approach to effective strategic thinking.

4. Limitation and future research

This study has a very limited regulation policy issue. A further study can be done on airline regulation such as open skies or even alliance joining and anti-competition market to see what alliance will face and bring the non competition law. This will gives policy makers an understanding of airline market and preparation.

The supply side research suffered from limitations of data availability. The results might not represent the entire industry due to the small sample size. Due to the fact that productivity and profitability could be affected by various factors, this study could not conclude whether the benefits of an alliance were actually derived from cost reduction or revenue increase. In regards to the number of alliances, a number of airlines cooperating in alliances in each year were studied, which may cause a time-trend in productivity. Additionally, even by using ICAO data where costs of airplanes were treated as capital stock, it was difficult to separate capital investment from costs for the study. In the future, need to find the exact factor what is the main source of productivity gains from alliance whether is more on revenue gain or cost reductions. And also expanding regression time frame to observe more clearly on when airline start to gain productivity and profitability after they joining alliance group.

For demand side, Global alliance benefits are only listed in airline materials and travelers are not necessarily aware of the benefits.as well as the aim is sometimes targeting only to high priority passengers. Sampling issues: Is my sampling good enough? Changes over time: Also there will be better to hand in different period of time to receive more reputations from passengers. Market specific: Market cannot describe competitive because of national carrier. Future research is proposed such as to handout more survey to travelers at other province in Thailand who need connecting flights on their international trip or even rearranged sampling for equal percentage of nationality in a different country. Another opportunity is to apply the survey procedure on various airline firms in different alliances, which would provide the ability to make comparisons among each alliance and to see the satisfaction of various passengers in a wider mode. Considering on doing better empirical study whether the importance of global alliance benefits play in determining airline choice by travelers. And even better if able to calculate travelers demand on air travelers.

Also, from the study it was found that passengers do consider air fare as the most important, so nowadays the airline industry has witnessed additional turbulence with the entry of airlines adopting new business models referred to as low-cost carriers, no frills airlines or budget carriers. Prominent examples of budget airlines include Ryanair, AirAsia (Malaysia, Thailand, and Indonesia), ValuAir, JetStar and Tiger Airways (Singapore). So it is better to perform the study on possibilities for low cost carriers to overdue full cost carriers on short haul flight and they may perform alliance and what affects the airline market would be in a position for the future.

Deployment of cutting-edge technology remains one of the key imperatives for airlines - especially since new technology offers the potential to improve productivity and reduce costs, thus circumstances of the negative impact of falling prices. Successive generations of aircraft, such as the Airbus A380, have dramatically raised the number of seats and flying range (for example, A380 offers 35% more seats than the Boeing 747-400). The latest aircraft also help airlines overcome infrastructure constrains, such as the overloaded air traffic control system by eliminating stopover and airport congestion and offer better in-flight facilities like bed suit, bar or shower in the A380.

Distribution of tickets through the Internet can save airlines travel agent commissions and lead to better yield management. In some parts of the world where the indirect distribution channel is still prevalent, this new channel can lead to substantial improvement in revenues. Technology deployment can also increase the choice of customer conveniences, which may in turn to build up customer loyalty, improve load factors and enhance the revenue potential. The most obvious application in this area is in-flight entertainment such as video on demand.

Appendix E: Budget carrier characteristics

The business model of budget carriers encompasses the following characteristics:

- Single country or narrow regional such as in Europe and Southeast Asia coverage, thus eliminating the need to pay overseas allowances to crew.
- A standardized fleet consisting of one type of aircraft, for example Boeing 737 or Airbus 320, which reduces maintenance and repair costs
- Higher utilization of aircraft. Southwest Airlines' average utilization rate for a Boeing 737 was 11.3 hours per day versus only 9.8 hours for Delta. The higher utilization is made possible by using less congested secondary airports to achieve faster turnaround time that can be as low as 20 minutes, operating point-to-point rather than hub-and-spoke service, and not assigning seat numbers to facilitate embarkation.
- Booking through the internet to save on travel agencies commissions, the cost of handling paper tickets; and wages paid to reservation agents.
- Higher seating density typically in a single class configuration.
- Continuously seeking ways to reduce costs. Almost all budget carriers have minimal cabin service, no free meals, which reduce the number of flight attendants needed.
- Usage of secondary airports, which typically have much lower landing, parking and other charges, in cities with minimum catchment areas. Interestingly, budget carriers in Japan have been constrained owing to the absence of this factor such as landing slot in Narita International Airport, Tokyo, Japan.

AppendixF: Alliance

Star Alliance

Star Alliance is the world's first and largest airline alliance. It is founded in 1997 with five original member airlines which are Air Canada, Lufthansa, Scandinavian Airlines System, Thai Airways International, and United Airlines. Since then Star Alliance members have increased considerably and there are now 26 member airlines. Also 3 more airlines are expected to become members in 2010. Star Alliance's headquarter is located in Frankfurt am Main, Germany. Below is the history of Star Alliance's membership.

- 1997 — The alliance was founded by Air Canada, Lufthansa, Scandinavian Airlines System, Thai Airways International, and United Airlines. Varig joined by November that year.
- 1999 — Ansett Australia, All Nippon Airways, and Air New Zealand became members.
- 2000 — Singapore Airlines, BMI, Mexicana, and the Austrian Airlines Group (Austrian Airlines, Tyrolean Airways and Lauda Air) joined.
- 2001 — Ansett Australia left the alliance due to bankruptcy.
- 2003 — Asiana Airlines, LOT Polish Airlines, and Spanair join.
- 2004 — US Airways joined the alliance. Mexicana's membership ended. Adria Airways, Croatia Airlines, Blue1 inaugurated the alliance's regional network.
- 2005 — TAP Portugal joined the alliance. After merging with US Airways under the US Airways name, America West Airlines joined through US Airways original membership.
- 2006 — Swiss International Air Lines and South African Airways joined.

- 2007 — Varig was ejected from the alliance on January 31st. Air China and Shanghai Airlines joined in December.
- 2008 — Turkish Airlines joined in April to become the 23rd member. Egypt Air joined in July as the 24th member.
- 2009 — Continental Airlines joined in October as the 25th member. Brussels Airlines is planning to join on December 9th.
- 2010 — Aegean Airlines and Air India are expected to join. TAM Airlines is expected to join in April 2010.

For the premium status, Star Alliance has two premium levels which are Star Alliance Silver and Star Alliance Gold. Star alliance's premium statuses have no requirement of their own and are based solely on the passenger's own frequent flyer programs of individual member airlines. Mostly every member of Star Alliance recognizes Star Alliance Silver and Gold statuses, only a few cases such as access to airline lounge are exceptions. Also, many member airlines have a premium status beyond Gold, but it is not recognized across Star Alliance.

Star Alliance Silver

Star Alliance Silver status is awarded to customers who have reached a premium level of a member carrier's frequent flyer program. The lowest qualification criteria for a Star Alliance Silver status is 10,000 status miles earned during one calendar year with Thai's Royal Orchid Plus program. Thai's Royal Orchid Plus Silver is valid for a full two years.

Benefits of Star Alliance Silver membership:

- Priority reservations waitlisting

- Priority airport stand-by

Some airlines also offer the following to Silver members:

- Priority boarding
- Priority airport check-in
- Priority baggage handling
- Preferred seating
- Additional checked luggage allowance
- Airport lounge access

Membership tiers granting Star Alliance Silver:

- Air Canada (Aeroplan) – Prestige
- Air China (Phoenix) – Silver
- Air New Zealand (Airpoints) – Silver
- ANA (Mileage Club) – Bronze
- Asiana (Asiana Club) – Gold
- Adria/Austrian/Croatia Airlines/LOT/Lufthansa/SWISS (Miles & More) – Frequent Traveller[48]
- BMI (Diamond Club) – Silver
- Blue1/SAS (EuroBonus) – Silver
- Continental Airlines (OnePass) – Silver
- EgyptAir (EgyptAir Plus) – Silver
- Shanghai Airlines (Flying Crane) – Silver
- Singapore Airlines (KrisFlyer) – Silver
- South African Airways (Voyager) – Silver
- Spanair (Spanair Plus) – Silver

- TAP (Victoria) – Silver Winner
- Thai Airways International (Royal Orchid Plus) – Silver
- Turkish Airlines (Miles and Smiles) – Classic Plus
- United (Mileage Plus) – Premier, Premier Associate
- US Airways (Dividend Miles) – Silver Preferred

Star Alliance Gold

Star Alliance Gold status is awarded to customers who have reached a high level of a member airline's frequent flyer program. The lowest qualification criteria for a Star Alliance Gold status is 35,000 status miles earned during one calendar year with Air Canada's Aeroplan program. The status is valid for one year.

Benefits of Star Alliance Gold membership:

- Priority reservations waitlisting
- Priority airport stand-by
- Priority boarding
- Priority airport check-in
- Priority baggage handling
- Additional checked luggage allowance of 20 kg (or one extra piece where the piece concept applies)
- Airport lounge access to designated Star Alliance Gold lounges on the day and at the place of departure, on presentation of a valid Star Alliance boarding pass.

Some airlines also offer the following to Gold members:

- Preferred seating (exit seat, or even on a special section on the plane on some carriers, which provides more leg room)

- Guaranteed seating on fully booked flights (subject to the booking class code and notice period)
- Free upgrade (in the form of voucher/certificate or automatic upgrade upon check-in)

Membership tiers granting Star Alliance Gold:

- Air Canada (Aeroplan) – Super Elite, Elite
- Air China (Air China Companion) – Platinum, Gold
- Air New Zealand (Airpoints) – Gold Elite, Gold
- ANA (Mileage Club) – Diamond, Platinum, Super Flyers
- Asiana (Asiana Club) – Platinum, Diamond Plus, Diamond
- Adria/Austrian/Croatia Airlines/LOT/Lufthansa/SWISS (Miles & More) – HON Circle, Senator
- BMI (Diamond Club) – Gold
- Blue1/SAS (EuroBonus) – Pandion, Gold
- Continental Airlines (OnePass) – Platinum, Gold
- EgyptAir (EgyptAir Plus) – Platinum, Gold
- Shanghai Airlines (Flying Crane) – Gold
- Singapore Airlines (KrisFlyer) – Solitaire PPS Club, PPS Club, Elite Gold
- South African Airways (Voyager) – Platinum, Gold
- Spanair (Spanair Plus) – Gold
- TAP (Victoria) – Gold Winner
- Thai Airways International (Royal Orchid Plus) – Gold
- Turkish Airlines (Miles and Smiles) – Elite Plus, Elite
- United (Mileage Plus) – Global Services, 1K, Premier Executive

- US Airways (Dividend Miles) – Chairman's Preferred, Platinum Preferred, Gold Preferred

Logo on aircraft

Some of the member airlines' planes are painted with the Star Alliance livery which usually features a white usually features a white fuselage with "Star Alliance" signature written across and a black tailfin with the Star Alliance logo. Asiana Airlines was the first Star Alliance member to have their aircraft painted in the Star Alliance livery. However, some member airlines including Air New Zealand, Lufthansa and Singapore Airlines have chosen to paint the tails of their aircraft with their airline logo. Aircraft that is painted in the airlines' own livery have the Star Alliance logo painted behind the cockpit.

Co-location (move under one roof)

In order to operate more efficiently and be able to provide a better service, airlines have started a plan to move their operation closer to each other in each airport, for example, into same terminal or same section of the terminal.

- In March 2008, some Star Alliance members started to move to Terminal 1 of London Heathrow Airport as part of a re-arrangement program. Star Alliance members Air New Zealand and United Airlines moved into Terminal 1 on June 10th 2008. Members Austrian Airlines, Croatia Airlines, Lufthansa, Swiss International Airlines, and TAP Portugal moved to Terminal 1 in June 2009. Asiana, BMI, LOT Polish Airlines, South African Airways and US Airways already operate from Terminal 1. All other members will remain at T3 (Except

Continental and TAM Airlines who will remain in T4) until Heathrow East is completed, where all members will then move.

- On March 26th 2008, all Star Alliance members moved operations to the new Terminal 3 of Beijing Capital International Airport in order to maintain simple transfers with Air China and other Star Alliance airline members. Continental Airlines moved its operations to Terminal 3 on July 30th 2009.
- Since the remodeling of Mexico City International Airport's Terminal 1, all Star Alliance carriers were re-located to the Hall F2 of the terminal's International Building. United Airlines, Air Canada, Lufthansa, and US Airways now have their check-in facilities inside a single hall. The gate assignation for Star Alliance member airline varies, although they tend to operate into the F gates. (F20-F28)
- At the same time as the move at Beijing Capital International Airport, all Star Alliance members are also expected to move to the new Terminal 2 at Shanghai Pudong International Airport to maintain simple transfers with Air China, Shanghai Airlines and other Star Alliance airline members.
- During the renovation of Paris-Charles de Gaulle Airport's Terminal 1, all Star Alliance members but Air Canada, Austrian Airlines, Swiss International Airlines and future members were re-located there, in order to "create" a Star Alliance Hub.
- International Star Alliance departures and arrivals serving San Francisco International Airport moved to Boarding Area G except for those of Air Canada and Asiana Airlines.
- In June 2006, all Star Alliance member airlines except Air New Zealand moved to the new South Wing in Terminal 1 of Narita International Airport to simplify transfers with All Nippon Airways.

- Star Alliance members serving Cairo International Airport have joined national carrier EgyptAir in moving their operations into the new Terminal 3. The transfer to the terminal started in April 2009 (EgyptAir) and completed in August 2009. This will allow seamless transfers between all members in particular EgyptAir. The terminal is the sole use of the Star Alliance partner airlines.
- All Star Alliance members at Miami International Airport (Air Canada, United, US Airways, Lufthansa and Swiss) relocated to the newly built Concourse J, as part of the airport's "alliance co-location" program; Star Alliance was a major contributor to the new Concourse and overall Terminal construction.
- In June 2008, Star Alliance member airlines were relocated to the west side of Incheon International Airport as part of the airport's renewal program, followed by the opening of the new Concourse A.
- At Toronto Pearson International Airport in March 2008, US Airways joined Star Alliance Partners Air Canada, United, Lufthansa, Austrian and LOT Polish in Terminal 1, where all Star Alliance member airlines (except Continental) are now located.
- In March 2008, Star Alliance member airlines were relocated to Terminal 2 at Warsaw's Frederic Chopin Airport.
- At Rio de Janeiro Galeão Airport, all Star Alliance members: TAM airlines (future member), United Airlines, TAP and US Airways will be relocated to Terminal 2.
- At Hamburg Airport, Brussels Airlines will be relocated to terminal 2, like the other Star Alliance members.

- At Tokyo Narita International Airport, Continental Airlines relocated to the South Wing of Terminal 1 on November 1st 2009 with all Star Alliance carriers.
- At Paris-Charles de Gaulle Airport, Continental Airlines relocated to Terminal 1 on November 17th 2009 with the other Star Alliance members.
- At Detroit Metropolitan Wayne County Airport, Continental Airlines will relocate to the North Terminal by March 2010, with all the other Star Alliance members.

OneWorld

OneWorld (CRS: ***O**) (styled as **one**world) is one of the world's three largest global airline alliances founded in 1999 by American Airlines, British Airways, Cathay Pacific, Canadian Airlines and Qantas Airways. Its central management team, OneWorld Management Company is based in Vancouver, British Columbia, Canada. Its slogan is "OneWorld revolves around you" and its vision statement is "to generate more value for customers, shareholders and employees than any airline can achieve by itself."

- The biggest expansion in its history was in 2007 when Japan Airlines, Malév and Royal Jordanian joined as full members, while Cathay Pacific's subsidiary Dragonair, two subsidiaries of LAN and Japan Airlines’ four subsidiaries joined as affiliate members. OneWorld celebrated its 10th anniversary in 2009 with the introduction of a new standard OneWorld livery, that all of its member airlines adopted on a proportion of their fleets; a special version of its logo.
- Currently, OneWorld and its member-elects reach over 720 destinations in over 140 countries. It operates over 8,300 daily flights, carrying 330 million passengers on a combined fleet of over 2,200 aircrafts. It is the only alliance that has a full network in Australia with Qantas and the only alliance with a member based in South America and Middle East with LAN and Royal Jordanian respectively. Since late 2002, OneWorld member airlines have developed common specifications across their engineering and maintenance activities, reducing costs through bulk buying and parts sharing.
- OneWorld was the first airline alliance to introduce interline e-ticketing across all member airlines' network.

- OneWorld was selected as the world's Best Airline Alliance in the 2002, 2004 and in 2005 received Business Traveler Awards
- Also, OneWorld was named the World's Leading Airline Alliance for the seventh consecutive year at the 2009 World Travel Awards.

New recruits

S7 Airlines, Russia’s domestic airline, was unanimously voted to join the alliance by 10 existing members on May 26th 2009. It will start offering the alliance’s services and benefits in 2010. Since S7 Airlines has one of the most extensive networks covering Russia and the Commonwealth of Independent States (CIS), it will add 54 cities to the alliance map, with 35 of them in Russia. However, the alliance agreement will not cover the airline's charter subsidiary, Globus Airlines. As a first step, S7 Airlines' network was added to the alliance's Global Explorer round-the-world product, offered by all the alliance and selected non-alliance members.

The latest airline to have joined OneWorld is Mexicana. The airline accepted a formal invitation to join the alliance in April 2008 and officially join the alliance on November 10th 2009. Also joining at the same time are its subsidiaries, MexicanaClick and MexicanaLink. Mexicana added 26 destinations to the Alliance map. Mexicana which started its service back in 1921 was selected as World Travel Awards' Best Airline Mexico and Central America for the eleventh year running and is a former member of Star Alliance. Its decision to leave Star Alliance in 2004 and later join OneWorld was the result of a decision to terminate its codeshare agreement with United Airlines and its preference for bilateral agreements with American Airlines and Iberia.

Premium status

Oneworld offers three premium status levels which are Ruby, Sapphire and Emerald based on the customer's tier status in the member airline's frequent flyer program. All of the statuses are recognized by each of the member airlines and the highest level in each member's program is Emerald. The premium statuses have no specific requirements of their own – membership is based solely on the frequent flyer programs of the individual member airline. Alliance benefits are only available to passengers on scheduled flights that are both operated and marketed by a member airline.

Oneworld Ruby

Customers who have reached the first premium level of a member airline's frequent flyer program are awarded with Oneworld Ruby status. OneWorld Ruby membership’s benefits include priority airport stand-by, priority reservations waitlisting, Business Class priority check-in and pre-reserved preferential seating.

Oneworld Sapphire

Oneworld Sapphire status is awarded to customers who have reached the second highest premium level of a member airline's frequent flyer program. The benefits of the Oneworld Sapphire membership include priority airport stand-by, priority reservations waitlisting, Business Class priority check-in, pre-reserved preferential seating, Business Class airport lounge access and priority boarding.

Oneworld Emerald

Customers who have reached the highest premium level of a member airline's frequent flyer program are awarded with OneWorld Emerald status. The benefits of the Oneworld Emerald membership include priority airport stand-by, priority reservations waitlisting, Business and First Class priority check-in, pre-reserved preferential seating, Business and First Class airport lounge access and priority boarding.

Co-location

Co-location help the alliance to provide its customers with smoother transfers between member airlines and better facilities than any of the member airlines could justify on their own. The alliance has combined ticket offices, lounges and check-in facilities at some 50 airports worldwide.

Customer service initiatives

Interline electronic ticket

OneWorld is the first airline alliance to enable its customers to fly throughout its members' network on electronic tickets (E-Tickets) only, started on April 21st 2005. Since all the information is stored electronically, E-Ticket made checking-in smoother and quicker and also made customers being able to access new automated features, like self-service, mobile or internet check-in. Furthermore, there is no risk of a ticket being stolen or lost like a traditional paper ticket.

OneWorld travel stations and OneWorld charging stations

Oneworld and Lonely Planet jointly introduced OneWorld Travel Stations on September 16th 2008. OneWorld Travel Stations are interactive installations to offer guides, tips and advice on what to eat, where to sleep, what to see, where to relax and how to do business on some of the world's leading cities which are the destinations of OneWorld member airlines. Travelers can download this information, language guides and audio to their smartphones, laptops or other devices. OneWorld also introduced OneWorld Charging Stations which are freestanding units for travelers to recharge their electronic gadgets such as laptops, PDAs, mobile phones. Both OneWorld Travel Stations and OneWorld Charging Stations are available free at selected airports in Europe. Oneworld Travel Stations won an Innovation Award 2008 from the Netherlands' Reisrevue travel trade magazine and was selected as a Silver Winner for Best Use of Technology from the US magazine Event Marketer.

OneWorld travel library

OneWorld introduced OneWorld Travel Library on June 3rd 2009. OneWorld Travel Library is a library service offering some of the world's most popular books in audio format featuring approximately 40 titles, including fiction, society, business and travel, available in English, Dutch, French, and Italian. The audio books can be downloaded for free to the traveler’s smartphones, laptops or other devices. Oneworld Travel Library is available at selected airports in Europe·

Livery and logo

A small OneWorld logo, 30 centimetres (12 in) in diameter, is painted on the right of the aircraft entry door of all alliance members’ aircrafts.

Standard OneWorld livery

OneWorld introduced its new standard OneWorld livery in February 2009 as a part of the alliance’s 10th anniversary celebration. It features the alliance name in large letters that are almost 2 meters (6.6 ft) tall and the alliance logo along the side of their fuselage, against a white or a polished metal background. The name of the operating member airline is placed in a standard position in a smaller lettering at the front of the aircraft below the alliance name and logo. Each member airline also retains its regular tailfin design.

SkyTeam

SkyTeam is the world's second largest airline alliance – smaller than Star Alliance but larger than OneWorld. SkyTeam is founded in 2000 with 4 original members; Aeroméxico, Air France, Delta Air Lines, and Korean Air. It now has eleven member airlines from four continents. The company slogan is "Caring more about you". SkyTeam also operates a cargo alliance called SkyTeam Cargo.

Since both Continental Airlines and Copa Airlines left SkyTeam in October 2009, with the merger of Northwest Airlines with Delta Air Lines completed, SkyTeam has now 9 full members and 2 associate members. However, Vietnam Airlines will join SkyTeam in early 2010 and that will make the number of SkyTeam's full members back up to 10.

- 2000 — Aeroméxico, Air France, Delta Air Lines, and Korean Air launched the SkyTeam alliance on June 22nd.
- 2001 — CSA Czech Airlines (in March) and Alitalia (in July) joined.
- 2004 — Continental Airlines, KLM and Northwest Airlines joined on September 13th. Their simultaneous entry was the largest expansion event in airline alliance history. As a result of the three new members, SkyTeam passed Oneworld to become the second largest alliance.
- 2005 — Even though member CSA pledged to help Malév Hungarian Airlines to become an associate member of the alliance (as opposed to a full member, an associate has no voting rights), Malév opted to join the Oneworld alliance, signing a Memorandum Of Understanding in May. A few days later SkyTeam announced four new associate members due to join by 2006, each one being "sponsored" by an existing member: Madrid-based Air Europa (sponsored by

Air France), Panama-based Copa Airlines (sponsored and partly owned by Continental Airlines), Kenya Airways (sponsored and partly owned by KLM) and Romania's Tarom (sponsored by Alitalia). Every associate adopted a frequent flyer program of a full member: Copa Airlines already used Continental's *OnePass* while Kenya Airways and Air Europa used Air France-KLM's *Flying Blue*.

- 2006 — Aeroflot joined on April 14^{th}.
- 2007 — Air Europa, Copa Airlines, Kenya Airways became associate members of the alliance on September 1^{st}. China Southern Airlines joined SkyTeam on November 15^{th} to become the 11^{th} full member and the first carrier from Mainland China to join SkyTeam.
- 2008 — Continental Airlines and Copa Airlines announced their intentions to move to the Star Alliance after Continental's final flight on October 24^{th} 2009.
- 2009 — Vietnam Airlines was invited to join in April. On October 24^{th}, Continental Airlines and Copa Airlines left SkyTeam.

Premium status

SkyTeam offers two premium levels which are Elite and Elite Plus, based on a customer's tier status in a member carrier's frequent flyer program. The statuses have no specific requirements of their own and membership is based solely on the frequent flyer programs of individual member airlines. Each of the member and associate airlines recognizes the elite statuses, with a few exceptions

SkyTeam Elite

Customers who have reached the premium level of a member carrier's frequent flyer program are awarded with SkyTeam Elite status.

Benefits of SkyTeam Elite membership:

- Priority reservations waitlisting
- Priority airport standby
- Priority boarding
- Priority check-in
- Preferred seating

Membership tiers granting SkyTeam Elite:

- Aeroflot (Aeroflot Bonus) - Silver
- Aeromexico (Club Premier) - Gold
- Air France-KLM (Flying Blue) - Gold (for residents of US and Mexico), Silver
- Alitalia (MilleMiglia) - Freccia Alata
- China Southern Airlines (Sky Pearl Club) – Silver
- Czech (OK Plus) - Silver
- Delta (SkyMiles) - Gold Medallion, Silver Medallion
- Korean Air (SKYPASS) - Morning Calm
- Northwest (SkyMiles) - Gold Medallion, Silver Medallion
- Vietnam Airlines (Golden Lotus Plus) - Titan (from June 2010)

SkyTeam Elite Plus

Customers who have reached the higher premium level of a member carrier's frequent flyer program are awarded with SkyTeam Elite Plus status.

Benefits of SkyTeam Elite Plus membership:

- Priority reservations waitlisting
- Priority airport standby
- Priority boarding
- Priority airport check-in
- Preferred seating
- Priority baggage handling
- Additional checked luggage allowance
- Airport lounge access
- Guaranteed reservations on sold-out flights
- Express airport security (in some hub airports)

Membership tiers granting SkyTeam Elite Plus:

- Aeroflot (Aeroflot Bonus) - Gold
- Aeromexico (Club Premier) - Platinum
- Air France-KLM (Flying Blue) - Platinum, Gold (for non-US/Mexican residents)
- Alitalia (MilleMiglia) - Freccia Alata Plus
- China Southern - Gold, Platinum
- Czech (OK Plus) - Gold, Platinum
- Delta (SkyMiles) - Platinum, Diamond Medallion

- Korean Air (SKYPASS) - Million Miler, Premium
- Northwest (SkyMiles) - Platinum
- Vietnam Airlines (Golden Lotus Plus) - Gold (from June 2010)

Co-locations

Asia

- Beijing Capital International Airport: Terminal 2.
- Ho Chi Minh City Tan Son Nhat International Airport: Terminal 2
- Incheon International Airport: East Side of Main Terminal for check-in
- Tokyo Narita International Airport: Terminal 1 North Wing, except that China Southern Airlines currently operates from Terminal 2.

America (except USA)

- Mexico City International Airport: Terminal 2, Air France and KLM are not moving their operations until the new cargo terminal is built aside Terminal 2, since the existing one is at the other side of the airport.
- Monterrey General Mariano Escobedo International Airport: When terminal B opens Aeromexico, Aeromexico Connect and SkyTeam member airlines will move into the new terminal.
- Toronto Pearson International Airport: Terminal 3, except Alitalia that currently operates from Terminal 1.

Europe

- Frankfurt Airport: Terminal 2
- London Heathrow Airport: Terminal 4 during 2009, Aeroflot, Air France, Alitalia, CSA and Korean Air will move to Terminal 4, completing the entire SkyTeam alliance at Terminal 4.
- Madrid Barajas Airport: Terminal 1 for international flights and Terminal 2 for European and domestic flights.
- Manchester Airport: Terminal 2
- Paris Charles de Gaulle Airport: Terminals 2E and 2F2 handle all international members, terminals 2D and 2F1 all European; Air France operates from 2C, 2D, 2E, 2F and 2G.

USA

- Atlanta Hartsfield-Jackson Atlanta International Airport: Landside - Terminal South except for KLM and Korean Air in Terminal North. Airside - Concourses T (International), A, B, C, D, E
- Chicago O'Hare International Airport: Terminal 2 (Northwest, Delta) International Terminal 5 (Aeromexico, Air France, Alitalia, KLM, Korean Air)
- Cincinnati/Northern Kentucky International Airport: Terminal 3
- Dallas-Fort Worth International Airport: Terminal D (KLM & Korean Air), Terminal E (Delta, Northwest)
- Detroit Metropolitan Wayne County Airport: McNamara Terminal
- Los Angeles International Airport: Terminal 2 (Air France, KLM), Tom Bradley International Terminal (Aeroflot, China Southern, Korean Air), Terminal 5 (Delta, Northwest, Aeromexico), Terminal 6 (Delta)

- New York Newark Liberty International Airport: Terminal B houses Delta Air Lines, Northwest Airlines, Air France and Alitalia.
- New York John F. Kennedy International Airport: Terminals 1, 2, 3, 4
- New York LaGuardia Airport: Delta Terminal and Marine Air Terminal (Delta shuttle flights to Boston, Chicago, and Washington)
- San Francisco International Airport: International Terminal Boarding Area A (International members), Terminal 1 Boarding Areas B & C (Northwest and Delta)
- Seattle-Tacoma International Airport: South Satellite Terminal

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