STRATEGIC ALLIANCES IN THE AIRLINE INDUSTRY

by

PABLO M. RAY

Ingeniero Industrial
Universidad de Buenos Aires, 1985

Submitted to the Sloan School of Management in Partial Fulfillment of the Requirements of the Degree of Master of Science in Management at the Massachusetts Institute of Technology

May 1992

© Pablo Miguel Ray, 1992

All Rights Reserved

The author hereby grants to MIT permission to reproduce and to distribute copies of this thesis document in whole or in part.

Signature of Author __________________________ Sloan School of Management May 1, 1992

Certified by __________________________

N. Venkatraman
Assistant Professor of Management
Thesis Supervisor

Accepted by __________________________

Jeffrey A. Barks
Associate Dean/ Master's and Bachelor's Programs
STRATEGIC ALLIANCES IN THE AIRLINE INDUSTRY

by

PABLO M. RAY

Submitted to the Alfred P. Sloan School of Management
on May 29, 1992 in partial fulfillment
of the requirements for the Degree of
Master of Science in Management

ABSTRACT

The trend toward forming worldwide alliances is a product of deregulation in the U.S.,
airline privatization in other parts of the world and the consolidation of regional economies.
World Airlines are establishing business partnerships among themselves at a rate
unprecedented in the post deregulation era. Though the partnerships may vary from simple
route agreements to substantial equity positions, they are bound to influence the structure of
the world airline industry as it matures in an expanding environment of free trade.

Using the methodology developed by Nohria and García-Pont (1991) this thesis will
provide the first step towards the analysis of the structure of strategic linkages developed
by the top 29 world-class airlines until 1991.

These linkages represented efforts by groups of firms to match the collective resources of
other groups. Although I can identify various reasons for linkage formation, the driving
force stems from the desire of airlines to make best use of the passengers who board their
aircraft, either from a commuter flight feeding a hub or an international flight.

The analysis of the industry structure combined with a qualitative description of the
alliances indicates that a major force in deciding strategic alliances was the airlines desired
to increase their networks and enhance their route structure. In achieving these objectives, I
will suggest that airlines look for geographic complementation among their route structure.

Thesis Supervisor: N. Venkatraman
Title: Assistant Professor of Management
ACKNOWLEDGMENTS

I would like to thank Professor N. Venkatraman for supervising this work and providing very helpful advice and comments.

I wish to express my sincere appreciation to Carlos García for introducing me to the network analysis. This thesis has been largely enriched by his comments, critiques and suggestions.

I make a special dedication to my wife Carola, who gave me continuous support and encouragement to finish this work.

Finally, I would like to thank my parents for their loving support through the years.
# TABLE OF CONTENTS

1. INTRODUCTION...........................................................................................................6

2. THE U.S. CASE...........................................................................................................8
  2.1 The U.S. Regulated Market (pre 1978).................................................................8
  2.2 The U.S. Deregulated Market (post 1978)............................................................9

3. COMPETITION AND STRATEGY.............................................................................11
  3.1 A large national and international route network.............................................11
  3.2 A sufficient number of strategically located hubs...........................................12
    3.2.1 Department of Transportation (DOT) ruling .............................................13
    3.2.2 Gates and other essential airport facilities...............................................14
  3.3 A Labor Agreement.............................................................................................14
  3.4 An 'in-house' automation system......................................................................14
    3.4.1 Yield management .......................................................................................15
    3.4.2 Travel agent commission overrides...........................................................15
  3.5 An attractive Frequent Flyer Program...............................................................16

4. REASONS FOR LINKAGE FORMATION IN THE AIRLINE
   INDUSTRY .................................................................................................................18
  4.1 Increase Size of Networks...................................................................................20
  4.2 Improve Service for Passengers .........................................................................21
  4.3 Acquire Rights to Fly.........................................................................................21
  4.4 Gain Productivity...............................................................................................21
  4.5 Practice Monopoly Power..................................................................................22
  4.6 Standardize Procedures......................................................................................23
  4.7 Increase Capacity...............................................................................................23
  4.8 Mitigate Impact of Economic Downturn...........................................................23
  4.9 Protect Local Economies...................................................................................23

5. TYPES OF ALLIANCES IN THE AIRLINE INDUSTRY.................................24
  5.1 The airlines' international presence in the different regions.............................25
    Table 5.1 - Passenger/Kilometers Performed by Region .....................................25
    Table 5.2 - Scheduled Traffic of Commercial Air Carriers ..................................26
  5.2 The size of each airline domestic operations....................................................26
    Table 5.3 - Passenger/Kilometers Performed by Region .....................................27
  5.3 The quality of the service for each airline.........................................................27
6. BLOCKS IN THE AIRLINE INDUSTRY ...........................................28
   Table 6.1 - Density Matrix..............................................28
   Table 6.2 - Number of airlines in each block by region ..........29
6.1 Aeroflot, Canadian and Pan Am ....................................29
6.2 Air Canada, Air New Zealand, American Airlines, Cathay
       Pacific, Japan Airlines, Qantas and Varig .......................33
6.3 Alitalia, Iberia and United .........................................38
6.4 British Airways, Delta, Singapore, Swissair ....................40
6.5 Eastern, KLM, Korean Airlines and Northwest .................42
6.6 Air France, Continental, Lufthansa, SAS, Thai International ..43
6.7 All Nippon, TWA and USAir .........................................47

7. DATA AND METHODOLOGY ...............................................52
   Table 7.1 - Rating of the strength of the relationship ..........53

8. CONCLUSION ........................................................................55

EXHIBITS
   Exhibit 1 - Top 29 Airlines ............................................56
   Exhibit 2 - Airlines Statistics by Block .............................57
   Exhibit 2 (cont.) - Airlines Statistics by Block ....................58
   Exhibit 3 - ATLAS Consortia ............................................59
   Exhibit 4 - KSSU Consortia .............................................62
   Exhibit 5 - Alitalia & Iberia agreement ..............................65
   Exhibit 6 - Alitalia & USAir agreement ...............................66
   Exhibit 7 - SAS & Texas Air agreement ...............................67
   Exhibit 8 - An Outlook at the Airline Industry ....................68
       Table A7.1 - Scheduled Passenger Traffic to Year 2000 ........68

REFERENCES ........................................................................72
1. INTRODUCTION

The trend toward forming worldwide alliances is a product of deregulation in the U.S., airline privatization in other parts of the world and the consolidation of regional economies. World airlines are establishing business partnerships among themselves at a rate unprecedented in the post deregulation era. Though the partnerships may vary from simple route agreements to substantial equity positions, they are bound to influence the structure of the world airline industry as it matures in an expanding environment of free trade.

Using the methodology developed by Nohria and García-Pont (1991) this thesis provides a first approach towards the analysis of the structure of strategic linkages developed by the top 29 world-class airlines until 1991. These linkages represented efforts by groups of firms to match the collective resources of other groups. Although I can identify various reasons for linkage formation, the driving force stems from the desire of airlines to make best use of the passengers who board their aircraft, either from a commuter flight feeding a hub or an international flight. A qualitative analysis of the linkages lead me to suggest that complementary geography among the carrier' routes is the most important objective for these alliances.

The structure of the thesis is as follows. Chapter 2 introduces the effect of deregulation in the US market and the changes affecting the competitive environment. Chapter 3 presents the nature of future competition and strategies followed by the most important American carriers. Chapter 4 discusses the reasons for linkage formation in the airline industry.
Chapter 5 analyzes the different linkages that can be formed among airlines. Chapter 6 describes in detail each strategic. Chapter 7 presents the sources of data and methodology used. Finally, Chapter 8 summarizes the conclusions and establishes the path for future research.
2. THE U.S. CASE

In analyzing the competitive airline market, it is highly appropriate to study the transition of the U.S. airline industry from a regulated to a deregulated market. An analysis of the forces that played a role in the twelve years of competition in a deregulated market in the U.S. will help the understanding of the future by drawing parallels between the regulated and deregulated market. The first reason that the deregulation of the U.S. market is chosen, as opposed to other deregulated domestic air-transport markets, is its sufficiently large size, both in terms of traffic volume and number and size of airlines. These factors allow it to be a useful model of a scenario for market conduct in the case of a relaxation of regulatory forces. The second reason for analyzing the deregulation of the US airline industry, is its role towards globalization. The third reason to study the US scenario is the implication of deregulation to the traveling public. This implication manifests in three ways: the vast majority of passengers now fly on routes served by at least two airlines; the majority of the nation's largest 200 airports are not concentrated; and airline fares, adjusted for inflation, on most routes remain below pre-deregulation levels\(^1\).

2.1 The U.S. Regulated Market (pre 1978)

In 1938 the Civil Aeronautics Act was passed setting up the Civil Aeronautics Authority, later renamed the Civil Aeronautics Board (CAB) to regulate the US airline industry. The CAB controlled entry, route selection and pricing. Airlines would receive a franchise on routes,

---

\(^1\) Economists at the Brooking Institution estimate that airline deregulation continues to generate $10 billion annually in savings to the traveling public - GAO/RCED-90-102 Fares and Service at Major Airports.
sometimes more than one airline per route, although most often the routes were being served by a single carrier. The route structure that followed from this policy for the different "trunks"\textsuperscript{2} was not based on economic reasoning or on efficiency aspects. The prices which were set by the CAB depended on the overall profitability of the air transportation system, and had little to do with the economics of each route.

The international routes were almost exclusively given to one airline, Pan American Airlines (Pan Am), while Trans World Airlines (TWA) received some routes to Europe, Northwest Airlines some routes to Japan and Asia, and Braniff to South America. This implied that all other major airlines were pure domestic carriers (except for cross border flights to Canada and Mexico).

\textbf{2.2 The U.S. Deregulated Market (post 1978)}

In October 1978, the U.S. Congress enacted the Airline Deregulation Act of 1978, which placed maximum reliance on competitive market forces to determine the quality, quantity and price of air transportation services to be provided by the airlines. The act even provided for termination of the industry's economic regulatory body, the Civil Aeronautics Board (CAB), at the end of 1984. Responsibility of international aviation was turned over to the Department of Transportation (DOT), which was also given the authority to approve airline mergers. The Deregulation Act instituted three major changes in the market:

\textsuperscript{2} Originally licensed airlines during the regulated era, also called "majors".
• New airlines were allowed to enter the market, if they complied with safety rules;
• All airlines were allowed to serve any (domestic) destination they desired, with both frequency and volume (e.g. seating capacity) left to their discretion;
• Airlines were free to set prices at their desired level.

As a quid pro quo for independence, the airlines have given up the protective coverage of the federal government. Market forces now determine an airline's financial fate, and there is no longer any guarantee that an airline will be in service to honor a passenger's advance ticket purchase.

The freedom to exercise managerial initiative has been the greatest single benefit of deregulation from the airlines' point of view. Managers have been able to experiment with (1) new routes, fares, and services, as demonstrated by the development of hub-and-spoke networks; (2) very low fares during times when the demand for air travel is traditionally low; (3) increased utilization of automation as a competitive tool; (4) "frequent flyer" programs; (5) management techniques and labor policies that are used commonly in other industries; and (6) partnerships with regional carriers, using a common code. Therefore, carriers were forced to become 'bottom-line' oriented.
3. COMPetITION AND STRATEGY

The elimination of entry, price and route destinations brought major changes in the industry. Carriers quickly found that they basically faced three choices: (1) to become a megacarrier, (2) to become a feeder to a megacarrier or (3) to become a 'niche' player, filling a small but well defined niche in the marketplace. The strategies implemented by most of the North American megacarriers are proof of the prevailing conviction that the first choice had been essential for survival in the new environment. Within this choice, U.S. airlines consider mass to be the single most important attribute for survival and consider the merger-acquisition process more cost effective and faster than internal growth as a means for acquiring mass.

The five key characteristics that airlines have selected to gain competitive advantage in the post-deregulation era are:

3.1 A large national and international route network, which could be reached by consolidating market share and increasing the total number of destinations served. The costs of airlines do not appear to fall as their size increases, so that simple economies of scale in operations cannot justify the merger movement. Note that labor and fuel are two major items of expense which, taken together, make up over 60% of operating expense. Of the remaining cash expense items, no single one comprises more than 5% of total operating expense. According to a study made by American economists there are no significant

---

3 Airline Economics, page 9
economies of scale to be made by increasing the size of an airline, but there are significant economies from increasing the density of the traffic on a given network of routes. The author concludes that the main influences on costs are the density of traffic on each route and the length of each flight stage.

In order to develop this domestic and international network, airlines have introduced a code sharing practice. Code sharing entails applying one flight code (flight number) for a flight that might consist of not only changing aircraft at the hub, but also changing carriers. This has aroused some controversy as it is also applied in international flights, where a US domestic carrier would take the traffic to the foreign airline gateway.

3.2 A sufficient number of strategically located hubs with cost-effective feeder systems. Deregulation allowed the airlines to reconfigure their routes systems into hub and spoke networks\(^5\). Hub and spoke operations concentrate most of an airline's operations at one or very few "hub" airports and connect virtually every other airport (spoke) in the carrier's system via nonstop service to the hub. The hubbing airline will schedule flights to bring in travelers from many spokes to the hub, transfer the passengers among planes, and send them off to their final destinations, all in a relatively short period of time. The hub and spoke system is not more than a network pattern, which allows the airline to reap the benefits of increased economies of scale. The merits of a hub and spoke system are two-fold: cost reduction for an airline and service enhancement for the passenger (in the form of

---

\(^5\) The concept of a hub and spoke system was not new, but only with a deregulated market it was able to develop into its full potential.
increased frequency). These two features are exchangeable, as one achieves cost reductions when keeping the frequency constant, or increases frequency at equal costs.

However hub and spoke systems require the hubbing airline to handle many simultaneous departures and arrivals several times a day; because of its numerous departures and arrivals, the hubbing carrier will control many of the gates or concourses or may even have exclusive rights to its terminal. From the passenger point of view, a hub and spoke system means increase in the flight time and transfers compared to 'non-stop' flights.

Another factors that have helped or deterred the airlines of developing the hubs are:

3.2.1 Department of Transportation (DOT) ruling: At four of the busiest airports in the Nation (O'Hare in Chicago, La Guardia and JFK in New York, and National in Washington) the number of takeoff and landing slots have been limited since 1969 and the slots are controlled by the airlines that have operated at those airports historically. Some studies have found that fares are higher at slot-controlled airports. Other airports restrict traffic and the type of equipment that can be flown in order to reduce the noise burden on the airport's neighbors. While noise restrictions are necessary, they also discourage new firms from entering the market. For example, in the past new carriers began operations with used aircraft. However these restrictions

---

6 Linking 'n' cities with previous arrangements (and non-stop flights) requires n * (n-1) flights, while with a hub and spoke system it only requires (n-1) flights. This means that non-stop linking increases the number of flights by a factor 'n'.
at many airports limit the use of older aircraft. Thus a new carrier may have to purchase relatively new airplanes if it wants to compete.

3.2.2 Gates and other essential airport facilities. These facilities at most of the nation's largest airports are limited by long-term exclusives leases. In addition, many airports face barriers to expansion [not in land, which they generally owned, but in terms of community opposition, air traffic control system, environmental regulation, unavailability of financing for expansion projects, and legal agreements between existent airlines and the airport (Majority-In-Interest Agreements)].

3.3 A Labor Agreement that provide low costs and high productivity in the long run. One key to profitability is cost control, and labor costs are the largest single item of expense for an airline. The bargaining power of organized labor is especially great in the airline industry. The inability to sell from inventory creates a problem for struck airline that is considerably greater than that faced in most other industries. Since deregulation, many new carriers have entered the industry and have provided a dampening effect because they typically have newer unions (or no unions at all) than the majors and less seniority on average than existing carriers.

3.4 An 'in-house' automation system to provide computerized reservations and the necessary analytical capability to manage yield and capacity cost-effectively. The importance of the computer reservation system S(CRSs) is because more than 80 percent of all air travel today is booked through travel agents, and 95 percent of all travel agencies use at least one of the five airline-owned computerized reservation systems
(CRSs) to book flights. CRSs can have anti-competitive impacts in two ways. First, although the systems no longer bias the screen displays to favor the flights of the CRS-owning airline, the CRS owners continue to get a proportionate share of bookings from agents using their systems. Second, travel agents continue to favor the airline that owns the CRS the agent uses because the CRS-owning airline maintains supportive business relationships with its network of travel agent subscribers - the so called 'halo effect'. These bookings for CRS owners are revenues lost to the airlines that do not own CRS.

Among other advantages of developing an in-house automation systems are:

3.4.1 Yield management which is an attempt by the airlines to optimize the passenger mix on each flight departure in terms of those paying full fares, those paying discount fares, and those paying deep discount fares. The development of CRSs and the evolution of sophisticated computer systems allow the airlines to deal with large volumes of frequently changing data. The airlines can change their prices on a seat-by-seat basis as often as every 15 minutes. As a result, the airlines make thousands of fare changes every day. This flexibility also permits incumbents to make rapid price adjustments in response to potential competitors from an entrant.

3.4.2 Travel agent commission overrides. The growing importance of travel agents has led airlines to develop incentive systems designed to increase their share of travel agent bookings. One such system, the travel agent commission override, is designed to reward the travel agent for bookings on an airline above and
beyond those agent would have made otherwise. The commission override is often based on all the traffic that the agent books on a particular airline. A 1988 Louis Harry survey showed that 51 percent of agency locations reported that they 'usually' (24 percent) or 'sometimes' (27 percent) chose an air carrier in order to get override commissions. Overrides raise the marketing costs of all airlines that pay them, and all carriers have the option of paying override commissions. Dominant carriers, however, need only to pay an override commission to the travel agents for increased bookings on flights that are threatened by a potential competitor. This might be a relatively small share of the dominant carrier's total traffic at the airport, but a larger proportion of the entrant's revenues from the service out of the airport much larger than that of the dominant carrier.

3.5 An attractive Frequent Flyer Program. Frequent flyers programs were designed to create brand loyalty, and it appears that they have been successful. Frequent flyer programs factor prominently in determining a traveler's choice of airline. According to a DOT survey of 32 travel agents, three-fourths reported that their business travel customers choose their flights on the basis of their membership in frequent flyer programs more than half the time. Therefore, frequent flyer programs can discourage potential competitors from challenging an incumbent airline at an airport where it is dominant. And because frequent flyers are often business travelers whose fares are paid by their employees, they lack incentive to switch to a new,
low-fare carrier and have considerable incentive to stay with the incumbent.

The development of large networks, the development of hub and spoke systems, the shortage of capacity at airports, the development of CRS and marketing techniques, and the reduction in the costs combine to give the large airlines more protection from the competition of smaller and possibly lower-cost airlines than they had in the early 1980's. The absence of economies of scale makes large airlines potentially vulnerable to competition from smaller airlines but the raising of the barriers to entry against these airlines was the change that has reduced the intensity of competition.
4. REASONS FOR LINKAGE FORMATION IN THE AIRLINE INDUSTRY

Inter-airline agreements and investments acted increasingly as bonding agents for groups of carriers. In any case, for one carrier to establish ties with another airline, market reach was extended.

New linkages may be a prelude to the development of truly international privately held carriers with large scale operations in every region of the globe. Total deregulation, where carriers enter and exit markets, determine frequency and capacity, and set fares free of government intervention, would largely eliminate the need for the bilateral agreement itself. Although such a regime is being phased in for U.S. domestic air transportation, it is not yet on the horizon for international aviation.

Although airline executives agree that marketing alliances are worthwhile, they disagree over whether the joint operations should get closer. Those who favor linkages tout the latest trends as the efficient and economical way to meet the needs of growing number of international passengers and the increasing weight and value of international cargo.

According to Sir Colin Marshall -- Deputy Chairman and CEO of British Airways -- "The airline market has become global by nature and airlines are growing to meet its demands. We believe that the global market of the future requires integrated world airline systems, predictable reliable in
terms of schedule, operational integrity, equipment and passenger service standard"7.

The organization of airlines under the various computerized reservations systems illustrates this trend well. Airlines share CRS carrier codes to make it easy for travel agents to sell tickets for a routing that may involve two or more carriers and the ticket may appear as if there were only one airline.

Even though the benefits of agreements may have been oversold, especially in terms of obtaining quick results, events were moving in the direction of making those relationships more meaningful or necessary8. For example at the proposed sale of Pan American World Airways' North Atlantic routes to United Airlines, the intricacies of bilateral agreements could result in British Airways gaining domestic routes in the U. S. Ambiguities in the U. S.-British bilateral agreement cast doubt on whether United will be permitted to land at Heathrow after taking over the route. In return for United receiving approval to operate from Heathrow, the British government will seek permission for BA to expand its U. S. network. This could lead to an increase in joint marketing agreements by motivating other airlines to counter expansion of the giants with such relationships. It will put pressure on companies like Northwest, which is not one of the (world's) largest, to be a more visible force in a world context.

7 Aviation Week and Space Technology, November 26, 1990, page 45
8 Edmund S. Greenslet, president of ESG Aviation Services.
In the following paragraphs we will comment on the specific reasons that airlines have been arguing for making alliances.

4.1 Increase Size of Networks: The principal reason for making agreements is that airlines increase the size of the networks, e.g. acquire a profitable route or add points together with its existing routes. A study conducted by Bailey\(^9\) found that if 56% of passengers on one airline's flights were continuing their journey on the same airline, the airline load factor would be 3.5 per cent higher than if only 10 per cent of passengers were continuing on the same airline.

Therefore the primary aim of the agreements was to capture and distribute more traffic. Airlines were looking to gain access to markets they would otherwise be unable to serve. For example, British Airways goes into Chicago, and then United goes out of Heathrow. Agreements like these looked well when you have a strong continuation of service rather than duplication. We can find another example in All Nippon Airways, that although was "huge" by international standards, it was forming alliances to expand out of its domestic Japanese base. The situation was similar for U.S. carriers that, in the latter stages of deregulation, were forced into mergers or acquisitions as competition grew.

Marketing alliances and joint operation of routes allow carriers to open service to new markets relatively quickly and easily. This helps

---

\(^9\) E. E. Bailey, D. R. Graham and D. P. Kaplan, Deregulating the Airlines, MIT Press 1985 - page 169
provide the economies of scale and the 'critical mass' airlines need to survive in increasingly competitive markets.

The growth of "megacarriers" fueled the development of joint agreements for smaller international airlines. Those agreements were a defensive tactical means of self preservation for smaller airlines seeking to protect market share and investment.

4.2 Improve Service for Passengers: the underlying concept in each alliance is to develop projects that would make travel more convenient for passengers. For example passengers from a provincial town in Sweden going into the U.S. and changing planes at Stockholm and Newark gets all the boarding passes at the beginning. Passengers will feel they are on one airline even if they change planes.

4.3 Acquire Rights to Fly: this is especially important in international routes, where the rights are settled by bilateral agreements, requiring government approvals. Deregulation and the privatization trend have encouraged airlines to operate as freely-run businesses and aggressively seek markets, though bilateral governments frequently have stymied progress. The restrictive bilaterals may have stimulated the plethora of intercarrier agreements.

4.4 Gain Productivity: although it is very hard to predict whether the alliance will improve productivity or not, arrangements could include sharing CRS systems, facilities (such as terminals) or sales offices in other regions. In the case of the Atlas and KSSU consortia the productivity
increase by specialization was the main reason for developing the agreements.

4.5 Practice Monopoly Power: the value of access to an airport derives from the monopoly profit that the holder of a large proportion of the landing rights can earn. Control over airports seems to provide the largest monopoly profits but this control is not easily eliminated. More airport facilities are needed. Even if terminal space is the only facility required, constructing or paying for the new space adds to the costs of entering a market. As a result, airlines purchases (with its landing rights) have become the price of entering a new market.

In the United States these costs might be reduced if the European method of providing such facilities were adopted, so that the airports owned the terminals and charged the airlines for using them. Although more capacity seems the prime requirement, building unwanted airports may not be a good use of resources. Some increase in capacity (and at the same time reducing the airlines' direct control over such capacity) seems the most effective method of preserving competition in the US airline industry and reducing monopoly power.

Another source of monopoly power for some of the largest airlines is their ownership of CRS (Computerized Reservations Systems). These services, used by travel agents to select flights for their clients, have been exploited by airlines to secure preference for their own services.
4.6 Standardize Procedures: airlines could standardize cockpits, galleys and other elements and therefore reduce training costs. By having the same procedures, alliance members could exchange aircrafts and reduced their unused capacity.

4.7 Increase Capacity: Because there is a long delay in shipments of aircrafts, such pacts allow the airline to serve routes that would not otherwise be available due to shortages of aircrafts, route rights, crew or slots. Note that on a world basis, the load factor on scheduled passenger flights is averaging in the upper 60% percent range, showing the possibility of limited improvement for increasing the load factor (See figures for load factor (LF) in Exhibit 2).

4.8 Mitigate Impact of Economic Downturn: a cost-sharing formula mitigates the impact of economic downturns on the partners. This reduces the risk of entering a new route, or can also mitigate the risk of exchange rates.

4.9 Protect Local Economies: Sometimes, local governments want to maintain a strong flag airline because it brings the following benefits to the whole economy: tourism, employment and foreign exchange. Alliances are also favored (as opposed to mergers or acquisitions) because of widespread limits on foreign ownership, and some financial and cultural relationships to particular nations.
5. TYPES OF ALLIANCES IN THE AIRLINE INDUSTRY

In a trend starting in the last decade, airlines have flocked to one another with international joint marketing agreements or financial interests\(^\text{10}\). Agreements involve all types of carriers -- large and small -- and cover everything from joint services, to interlining, to sharing the seats on an aircraft, to joint promotions and baggage handling.

As we said before key ingredients to intercarrier agreements, past and future, are the needs of airlines in specific markets. Alliances that begin with a beneficial exchange of traffic can end there or have the potential for the development of programs to maintain and operate like aircraft, to train personnel, or to jointly buy the variety of supplies required to keep an airline flying.

Successful agreements will lead to other forms of cooperation in the 1990s, perhaps to more fundamental areas as aircraft maintenance and crew training. We can find an example of these kinds of agreements in the Atlas or KSSU consortias (see Exhibits 3 and 4 for the description of those agreements).

We will provide a framework of linkage classification that could help us to understand the opportunity structure and underlies the formation of strategic blocks. The framework establishes a three dimensional classification of linkages that will be later used to show the kinds of blocks

\(^{10}\) KLM Royal Dutch Airlines' participation in the Wings West buyout of Northwest Airlines is a standout example of financial interests.
that are expected to merge. The three criteria that we use to classify the linkages in the airline industry are:

5.1 The airlines' international presence in the different regions.

Airlines were first interested in increasing their international presence. Therefore there were looking for alliances that will increase their networks, and routes that were complementary to their route structure.

For example, some airlines were well-positioned in the global markets: British Airways was powerful in Europe, and was represented in the U. S.. United was powerful in the U.S. and Asia and strong in Europe. These kinds of moves by the very largest and strongest will force others to begin to tighten those bonds and linkages with other carriers.

Table 5.1 shows the evolution of the markets by region. The largest markets are the North American and the European. This explain the reason for all the alliances between airlines of the different regions.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EUR</td>
<td>365</td>
<td>428</td>
<td>439</td>
<td>476</td>
<td>508</td>
<td>546</td>
</tr>
<tr>
<td>NAM</td>
<td>446</td>
<td>569</td>
<td>624</td>
<td>684</td>
<td>726</td>
<td>744</td>
</tr>
<tr>
<td>A&amp;P</td>
<td>160</td>
<td>222</td>
<td>237</td>
<td>271</td>
<td>309</td>
<td>320</td>
</tr>
<tr>
<td>LAM</td>
<td>60</td>
<td>68</td>
<td>75</td>
<td>77</td>
<td>79</td>
<td>87</td>
</tr>
<tr>
<td>AFR</td>
<td>30</td>
<td>37</td>
<td>35</td>
<td>35</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>MEA</td>
<td>28</td>
<td>43</td>
<td>43</td>
<td>45</td>
<td>46</td>
<td>48</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1089</td>
<td>1367</td>
<td>1452</td>
<td>1589</td>
<td>1706</td>
<td>1786</td>
</tr>
</tbody>
</table>

Source of Statistics: ICAO Digest of Statistics - Traffic (Series T)
Table 5.3 shows the market share of each region from 1980 to 1989. It is interesting to note that North American market is more mature than the European. Since 1987 Europe has been gaining market share, explaining the interest of North American carriers in that region. An interesting point is that the Asia & Pacific region is the fastest growing region.

![Scheduled Traffic of Commercial Air Carriers](image)

5.2 **The size of each airline domestic operations.**

Another factor in considering an alliance is the size of the domestic market and the airlines position relatively to their domestic market. Exhibit 1 shows the market share (Share) for each airline relatively to their region.
When we consider only domestic markets, the difference between the North American and the European regions is greater, as we can see from Table 5.3. This again shows us the importance for other airlines to penetrate the North American market.

<table>
<thead>
<tr>
<th></th>
<th>1988</th>
<th>1989</th>
<th>1988 %</th>
<th>1989 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUR</td>
<td>248</td>
<td>261</td>
<td>26.23%</td>
<td>27.35%</td>
</tr>
<tr>
<td>NAM</td>
<td>546</td>
<td>547</td>
<td>57.87%</td>
<td>57.19%</td>
</tr>
<tr>
<td>A&amp;P</td>
<td>99</td>
<td>95</td>
<td>10.52%</td>
<td>9.93%</td>
</tr>
<tr>
<td>LAM</td>
<td>34</td>
<td>36</td>
<td>3.57%</td>
<td>3.73%</td>
</tr>
<tr>
<td>AFR</td>
<td>9</td>
<td>9</td>
<td>0.94%</td>
<td>0.94%</td>
</tr>
<tr>
<td>MEA</td>
<td>8</td>
<td>8</td>
<td>0.88%</td>
<td>0.86%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>944</strong></td>
<td><strong>956</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source of Statistics: ICAO Digest of Statistics - Traffic (Series T)

5.3 The quality of the service for each airline.

We will also expect that the quality of service will be similar for those airlines making alliances. Take the example of a code-sharing agreement, where passengers could change airlines. If those airlines don't have a similar quality of service, the one with the highest could be affected by the poorer service of the other airline\(^{11}\). And, because a strong reputation regarding quality of the service is very hard to achieve, airlines are very careful about issues that could affect service quality.

---

\(^{11}\) According to Alfred Kahn (former chairman of the Civil Aeronautics Board, and architect of U.S. deregulation) the SAS-Texas Air Agreement strengthens Texas Air operation because the low-fare orientation of the subsidiaries Eastern and Continental Airlines. This could lead to a loss of airline identity (referred to SAS). Source: Aviation Week and Space Technology, October 10, 1988, page 110.
6. BLOCKS IN THE AIRLINE INDUSTRY

Out of the 29 airlines included in the network we obtained 7 clusters of firms which are shown below.

Block   Airlines
1      Aeroflot, Canadian and Pan Am
2      Air Canada, Air New Zealand, American Airlines, Cathay Pacific, Japan Airlines, Qantas and Varig
3      Alitalia, Iberia and United
4      British Airways, Delta, Singapore, Swissair
5      Eastern, KLM, Korean Airlines and Northwest
6      Air France, Continental, Lufthansa, SAS, Thai International
7      All Nippon, TWA and USAir

Table 6.1 shows the density matrix for those blocks. We can notice that almost all diagonals are significant, except for block 5.

Table 6.1 - Density Matrix

<table>
<thead>
<tr>
<th>Block</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.667</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>0.524</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>0.667</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>0.667</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.167</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.500</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.000</td>
</tr>
</tbody>
</table>

Matrix density: 0.123 - Cutoff value: 0.126 - Average Diagonal Density: 0.504
Table 6.2 shows the regional distribution of the airlines by block. It is interesting to note that all blocks have an "American" airline in order to access the US domestic market, which is the world's largest.

<table>
<thead>
<tr>
<th>Region</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Europe</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Asia &amp; Pacific</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Latin Am. &amp; Caribe</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Africa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- -</td>
</tr>
<tr>
<td>Middle East</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- -</td>
</tr>
<tr>
<td># Airlines/Block</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>29</td>
</tr>
<tr>
<td># Regions/Block</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>- -</td>
</tr>
</tbody>
</table>

Exhibit 2 shows the statistics for each block in terms of passengers carried, market share (relative to the region), revenue passenger per kilometer, load factor, tons carried, capacity, revenue, assets, revenue and cost per km, number of employees and number of airplanes.

In the following paragraphs we will discuss the linkages within each block.

6.1 Aeroflot, Canadian and Pan Am

Pan Am has been the largest international airline in the US, and Aeroflot was the only one in the USSR. The USSR has the largest land mass of any nation in the world, covering 8.65 million sq. mi., and Aeroflot was ranked the world's largest airline.
Aeroflot has more than 25 joint ventures with Western companies and it has been setting up alliances in an effort to increase air travel between the U. S. and the USSR, which have been constrained by a lack of capacity, limited access to U. S. markets and the dearth of quality hotel rooms in the USSR.

Aeroflot and Pan Am have jointly operated New York-Moscow flights since May 14, 1988. Both carriers sell their own tickets on the flights, which are conducted using Pan Am 747s and flight crews and mixed cabin crews. In addition, Aeroflot offered two of its own flights to Moscow from New York, and two from Washington. Pan Am offers two flights a week from New York, which make change-of-gauge stops in Frankfurt, West Germany. Besides Pan Am, Trans World Airlines was the only U. S. airline authorized to fly passengers from New York to Moscow in scheduled service.12

Another reason for an alliance between Aeroflot and Pan Am was the infrastructure in Moscow and Leningrad. A joint venture between Pan Am and Aeroflot, SPATE (Soviet-Pan Am Travel Effort) distributed Soviet tour packages and hotel space in the U. S.. The agreement with Pan Am and Sheraton was an attempt to solve the lack of hotel rooms in Moscow and Leningrad. Under the agreement with Aeroflot and Mossoviet, the governing body of the USSR's capital, Sheraton and Pan Am will build a $ 75-million, six-story, 450-room hotel on Gorky Street, about 1 mi. north of the Kremlin. The Sheraton Moscow,

12 American won the right last spring to begin providing passenger service between Moscow and Chicago next year under the newly revised U. S.-USSR bilateral air services agreement.
which will cater to business travelers, should be completed by 1992. It will be managed by Sheraton and built and staffed primarily by Soviet citizens. The partners also plan to build a second hotel of similar size, tentatively to be called the Budapest Hotel, at a site closer to the Kremlin. Pan Am Corp., the parent of Pan American World Airways, and Aeroflot each hold a 10% stake in the hotel company. Sheraton, a subsidiary of ITT Corp., and Mossoviet each own a 40% share.

Aeroflot has also completed agreements to market Aeroflot flights through American Airlines' SABRE computer reservations system. The SABRE and hotel pacts (with Pan AM and Sheraton) should advance Soviet efforts to attract more foreign travelers and to generate more ticket sales in hard currency rather than Soviet rubles. Aeroflot makes little money from Soviets buying tickets in rubles; it prefers sales paid for in dollars or other hard currencies. Soviet citizens who have filled flights to capacity between the USSR and the U. S. have paid for tickets in rubles, which are converted to dollars at a substantial loss. The official conversion is 0.6 rubles to a dollar, but dollars sell for 10 times that amount on the black market. Therefore, every purchase Aeroflot makes in dollars, such as for Pan Am's services at JFK, draws large amounts of rubles from Aeroflot. SABRE could alleviate this problem by permitting Aeroflot to book more U.S.-originating, dollar-paying passengers. Soviet citizens have been traveling out of the USSR and they have been crowding Westerners out of flights to the Soviet Union for weeks at a time, depriving Aeroflot of hard-currency sales. Aeroflot's capacity problem has been
aggravated in recent years as warming relations with the West and relaxed visa restrictions spurred the demand for international air services within the USSR.

Other reasons considered by Aeroflot in making alliances were the quality and quantity of civil transport aircraft produced within the Soviet Union. They were inadequate to allow the airline to benefit fully from the surging demand.

Aeroflot's agreements with other carriers include a Lufthansa contract to upgrade terminals at Moscow's Sheremetyevo1 airport and an inflight catering kitchen built by Marriott Corp. Aer Rianta, Ireland's national airport authority, operates a duty-free shop at Sheremetyevo2 under a joint venture with Aeroflot called Aerofirst, and the parties are considering expanding their joint operations to airports in Kiev in the Ukraine, the Russian city of Leningrad and Sochi, Minsk in Byelorussia, and Tashkent, Uzbekistan.

Pan Am's strategy was relegated to niche markets in Florida, Latin America, Central Europe, Scandinavia and the Middle East and reliant on the marketing strength and traffic feed of United.

Canadian Airlines International's started a Montreal-Moscow service in 1991. Aeroflot Soviet Airlines was flying round trip twice a week between the cities under an air services agreement. Canadian Airlines and Aeroflot have agreements to provide ground handling for each other at Montreal and Moscow. Canadian Airlines International also is
the general sales agent for Aeroflot in Canada, a relationship that could be expanded to a joint-marketing agreement once the Calgary, Alberta-based carrier begins service to Moscow.

6.2 Air Canada, Air New Zealand, American Airlines, Cathay Pacific, Japan Airlines, Qantas and Varig

American Airlines, the largest US carrier, has chosen not to pursue large-scale marketing pacts. Like many carriers it has code-sharing agreements with other airlines, notably Qantas and Cathay Pacific. But its international strategy is based primarily on expansion with internal resources. American Airlines has done little in respect to marketing agreements in Europe, but is doing a lot relative to positioning themselves in the marketplace. They have a large presence in the U. K., France and Germany, they're working on Italy and they're moving into the East Bloc very quickly.

American was planning to add Italy as a destination in 1990, and it was interested in serving Scotland's Abbot Sinch, the close-in Glasgow airport, and obtaining additional flights to Manchester, England. Until 1990, American served 13 European cities.

Qantas was in a good position from a fleet standpoint to become the region's major international carrier. The carrier transports about 4 million international passengers a year and ranks 18th among world airlines in that category. But the thin domestic traffic base in

---

13 It operates 29 Boeing 747s, including eight new 747-400s, with six more of the long-range wide-bodies to be delivered. Qantas also flies 13 long-range Boeing 767s, and has six more new 767-300s to come.
Australia, with a population of 16 million, could hinder the carrier's development across the region. Rival Cathay Pacific is a large force in the region, and the Japanese carrier, All Nippon Airlines (ANA), is the Pacific region's leading passenger carrier. Uncertainties about deregulation have shaken industry experts' confidence in Qantas. In Canada, with a market larger than Australia's domestic, carriers dropped by the wayside.

The Australian government has been liberalizing its international landing rights policy to attract more foreign carrier service and increase tourism. This shift increases competitive pressures on Qantas. Although Qantas will remain Australia's only international passenger carrier, the government studied a proposal that would allow the creation of a similar franchise to carry freight on a scheduled basis. The new landing rights program places Australia's national interest over that of Qantas' for the first time. According to Ralph Willis, Minister for Transport and Communications to Australia's House of Representatives, "an important objective in the new landing rights strategy must be to increase net earnings from inbound tourism, along with flow-on benefits to industries serving the tourism sector". Australia wants a bigger slice of world tourism and trade. According to Willis, improved air services would make the country more competitive in world markets. The increases in tourism would aid the Australian government's battle to reduce a record trade deficit. Visitors from abroad contributed $4.8 billion (Australian) to the

---

14 Aviation Week and Space Technology, June 26, 1989, page 97
country's economy in fiscal 1987-88 and accounted for about 1.4% of Australia's gross domestic product. Qantas forecasts an average 9% increase in annual international tourists visits to Australia through the year 2000. The Australian deficit do not allowed the government to expand Qantas fleet, so the airline will have to slow its growth and lose market share to the more than 30 international airlines that also fly to Australia.

Under the new plan, carriers such as Swissair that desire routes to Australia will no longer be stymied by Qantas' lack of interest -- or capability -- to provide reciprocal service. The policy change had been fueled by the shortage of airline seats to Australia during the fiscal 1987-88 year. In that period the number of tourists arriving in Australia jumped 26%. Individual markets, such as Australia-Japan, saw growth rates as high as 64%. Award of rights to European airlines will increase Qantas' ability to operate hubs in London and Frankfurt after planned unification of the European air transport market in 1992. Other features of the government plan included the removal of most price controls on international flights and promotion of smaller Australian gateways, such as Cairns, in northeast Australia. Future bilateral agreements will be negotiated with flexibility to accommodate rapid growth. Qantas management generally supported the policy changes, confident the airline could resist the increased competition and benefit from the greater number of travelers.

Industry experts foresee the possibility of Qantas taking a larger role in Australian aviation and monopolizing the air transport industry.
They foresee development of a two-way system with privately held Ansett Australian leading one group and Qantas the other, rather than a three-way fight because the Australian market couldn't bear it.

Strong investment relationships with other world airlines may be sufficient to keep Qantas as a potential megacarrier. A link to Europe would be beneficial to Qantas, particularly as Western Europe moves toward economic union in 1992-93. Thus, Qantas was actively seeking a partner. Because Qantas was a huge chunk of the Pacific market, whoever aligns with Qantas will cause a chain reaction of other people entering into agreements to protect themselves. Qantas officials frequently mention British Airways (BA) as a partner welcoming investment by BA or other carriers. To facilitate the alliance, the Australian government changed the law, allowing foreign investors to acquire up to 40% interest in Australian Airlines and 35% in Qantas15.

Qantas has also developed several business alliances but none involving mutual investment. It operates a blocked-space arrangement with Aerolíneas Argentinas between Buenos Aires and Sydney. Qantas and American Airlines have a block seat arrangement which allows Qantas to serve the Sydney-New York market via the West Coast16 and share computer reservations system codes. The Australian flag carrier, American and Japan (JAL) airlines have bought shares in Air New Zealand. Qantas owns a 19.5% share, while American and Japan

---

15 The 35% restriction on Qantas investment is aimed to maintain the airline's status as a flag carrier.
16 Qantas buys 10 first-class and 25 economy seats on American transcontinental flights that are linked with Qantas operations into San Francisco and Los Angeles six days a week.
Airlines each own a 6.5% share. Because of this investment, both American and JAL are considered potential investors in Qantas. Qantas also has a connection with American's SABRE reservations system and both carriers were among several carriers that discussed forming a South Pacific-based system, Fantasia, which did not materialize.

Strengthening ties among Qantas, Air New Zealand, Ansett and Australian Airlines will enable them to better compete with foreign megacarriers in international markets.

A consortium including Qantas, American Airlines and Japan Air Lines has purchased Air New Zealand from the New Zealand government for $3.3 billion. Other members of the consortium include Brierley Investments, Ltd., a New Zealand company, the New Zealand public and the airline's staff. The pact allows control of the airline to remain in New Zealand while promoting feed from minority shareholders Qantas, American and Japan Air Lines. Intense, cabinet-level lobbying by Air New Zealand management and British Airways overturned an earlier government decision to sell a 25% share of the airline to Qantas alone. Air New Zealand officials were worried that a link with the Australian flag carrier would not be in the best financial interest of the airline. They feared that profits would be used to finance a planned Qantas fleet expansion. The resulting partnership also would have had a monopoly on profitable Trans-Tasman Sea routes between the two countries. The new agreement guarantees that Air New Zealand will maintain its own identity and flag-carrier status.
Japan Air Lines' interest in the consortium follows a sharp increase in Japanese tourist and business travel to New Zealand. Passenger counts between the two countries increased about 40% in 1988. Japan Air Lines and Air New Zealand operate a total of six Boeing 747 flights a week between Tokyo and Auckland.

6.3 Alitalia, Iberia and United

Spain's Iberia and Alitalia of Italy have signed a commercial cooperation agreement designed to strengthen their respective market penetration in Asia and Latin America. Under terms of the accord (see Exhibit 5), the carriers will operate code-sharing flights that, in one direction, will feed Italian passengers through Madrid for flights to Iberia's traditionally strong Latin American market. In the other direction, traffic from Spain will be fed from Madrid through Rome for Alitalia flights to that airline's already-developed Middle East and Far East route network. One of the reasons for the agreement was to keep the Spanish and Italian passengers in their home markets and not lose them to carriers in Northern Europe. The market for air travel from Italy to Central American destinations and from Spain to the Middle East and Far East was estimated at 700,000 passengers annually, but neither Alitalia nor Iberia were able to benefit fully from it because passengers have to go to other gateways --such as Frankfurt, Amsterdam, London or Paris.

The cooperation is expected to allow Iberia and Alitalia to offer more frequent flights to targeted destinations in a way that they can funnel in passengers from both carriers while controlling costs. The carriers'
managers said the two airlines have some similarities that make such cooperation a natural linkup. Both are located in Southern Europe; both have a strong tourist flow to their countries, and they are members of the European Atlas aircraft maintenance grouping which they believed is something that is of real interest for both companies. In addition, Rome and Madrid can become hubs to connect Europe with the Asian and Latin American markets.

Several executives said that Spain's Iberia International Airlines, for instance, has positioned itself well by developing South American routes. Alliances based on niche markets are one survival technique that has worked well for smaller carriers.

Alitalia and USAir have signed a commercial cooperation agreement aimed at improving market penetration and increasing passenger traffic between Italy and the U. S (see Exhibit 6 for a complete detail of the agreement). Airline managers said the new agreement was expected to help Alitalia maximize the use of its current North American gateways and those to be added as a result of a renewed Italian/U. S. bilateral agreement. For USAir, the accord would increase the carrier's presence in the European market, particularly in the Southern Europe/ Mediterranean area. The airline was operating one route to Europe -- Charlotte, N. C., to London -- and added a new route between Pittsburgh, Pa., and Frankfurt, West Germany. Both partners felt it was important to start an agreement on a reasonable basis and then let it build to however large it can become. "Although we was considering some further expansion of our own international
service, we have reached the basic decision that we would rely upon agreements such as this one for the bulk of our participation in the international market. We have no dreams or aspirations of becoming a major international carrier", Randall Malin, USAir Vice Chairman and Executive Vice President said. The pact marked the first time USAir has reached such an accord with a foreign carrier. Although the airline had opportunities to become a partner with virtually every foreign airline that serves the U. S, its strategy in the past was to remain neutral.

United has no route authority to Europe, however, and U. S. government negotiators fear a round of pre-1992 protectionism could crimp United's plans and possibly those of other American carriers. Some nations in Europe have strong protectionist elements. There are some who will be scared by United, a longtime competitor in the transatlantic market. France especially has been resisting expansion and new entry by other U. S. airlines. Of the 10 major U. S. airlines, only United, Eastern and USAir-Piedmont do not serve France.

6.4 British Airways, Delta, Singapore, Swissair

British Airways has had a marketing agreement with United Airlines since January, 1988. Its chief goal was to feed passengers into each other's systems. This was done through such means as joint holiday programs, code sharing, joint automatic check-in procedures and sharing facilities. Both airlines intend to continue operating under these arrangements, and a British Airways stake in United would strengthen the relationship. British Airways was also considering
buying a stake in UAL. U. S. law would prevent British Airways from acquiring more than 25% of United's common stock. But the British carrier could contribute substantial equity in any partnership with United. British Airways and United have joint facilities that enhance arrangements in locations such as Chicago, Washington and Seattle. Other areas of cooperation include joint cargo services and some tour offerings. The aim of this agreement is to do anything they can on an interline basis to expand the reach of each other's airline. Some industry analysts regard the British Airways agreement as a natural evolution of the agreement. They first agreed to accept each other's tickets, baggage and so on. After that, if it looked like it would expand sales, they would established joint fares. United realized that with so many U. S. carriers flying to Europe, an expansion of its program with British Airways would be good for both companies.

A primary goal in developing alliances at Delta was to block an attempted hostile takeover. Both Swissair and Singapore Airlines agreed to buy 5% of Delta Air Lines stock, while agreeing to vote their shares according to the direction of the Delta board. Combined with about 14% of the Delta stock owned by company employees, this places 24% of the airline's shares in presumably friendly hands. But like other agreements, the heart of Delta's Swissair and Singapore pacts was to capture and distribute traffic. This effort involved joint advertising and marketing promotions as well as coordinating schedules. Delta became a potentially large feeder carrier for Swissair in the U. S. Swissair became a major feeder for Delta in the Middle East, Africa and some points in Europe. Delta's service from Atlanta
to Mexico City was an example of an evolutionary agreement. They refined connecting schedules. Swissair brings passengers into Atlanta, and Delta take them into Mexico City. Delta coordinate the schedule, transfers and checks in passengers. In essence Swissair can now promote Mexico City.

One unusual feature of the Delta-Swissair agreement was collaboration on MD-11 development. Both airlines have placed orders for the aircraft, which is a follow-on to the McDonnell Douglas DC-10. Delta and Swissair engineers were trying to establish common requirements for a variety of features, including cockpit configuration and galley design. "Maybe somewhere down the road, if we lease equipment from each other, or have an aircraft interchange agreement, the cost would be considerably less for training pilots and cabin crews," Al Kolakowski, Vice President-Sales for Delta said.

6.5 Eastern, KLM, Korean Airlines and Northwest

The chief link between Northwest and KLM was financial. In 1988 KLM put up $400 million to aid Alfred Checchi's Wings Holdings, Inc., in his buyout of the U. S. carrier. The U. S. Transportation Department approved KLM's investment on the condition that it be reduced. At the time, the airlines planned to tap into each other's routes, with Northwest's Pacific and domestic system complementing KLM's European and transatlantic network. But nothing material has been accomplished. The partners lost an opportunity when KLM's application for Detroit-Amsterdam service was turned down by the Transportation Department. Detroit is one of Northwest's larger
secondary hubs, and would have provided excellent traffic for the KLM system. Although the route application fell through, plans envisioned for the service illustrate the direction that the joint marketing would follow. Both airlines were making arrangements to have block seat sharing. The most lucrative opportunity for Northwest was in Amsterdam, KLM's home base. Northwest flew there from Boston and KLM did not. Frequencies vary from three times a week in the winter to daily flights in the summer. Northwest wanted somehow to tie one of its hubs with Amsterdam. In addition to the failed Detroit application, a number of distractions slowed the forging of agreements. Despite a strong year for traffic growth, Northwest has been concerned about its balance sheet which has deteriorated. At the same time, KLM has been preoccupied with earnings problems.

6.6 Air France, Continental, Lufthansa, SAS, Thai International

Scandinavian Airlines System (SAS) and Texas Air Corp. were among the first who established a partnership which later became a trend among the world's large airlines toward stronger interairline linkages and global networks. SAS took a 10% equity interest in Texas Air valued at approximately $55 million and gained access to the U. S. market that bilateral negotiations have denied them (see Exhibit 7 for a complete detail of the SAS & Texas Air agreement). The father of the Scandinavian strategy to form a global network -- SAS President Jan Carlzon -- sat on Texas Air's board of directors. In return, Texas Air Corp. and subsidiaries Continental and Eastern airlines were

---

17 In 1990 Northwest recorded third-quarter net earnings of $91 million, but this was down from $134 million in 1989.
gaining $50 million from SAS as an entry fee for access to Texas Air facilities in the U.S. Additionally, Texas Air’s System One computer reservations system merged with the Amadeus system owned by SAS and other European airlines. The linkup with Texas Air extends SAS’s network to the lucrative U.S. markets and strengthens its connections to Australia, South America, Canada and Japan. Jan Carlzon and Texas Air’s Chairman Frank Lorenzo called the Preferential Air Carrier Agreements between the two airlines the first comprehensive, global airline alliance. They established a linkage between the two carriers’ routes, baggage handling, customer representative training and computerized booking systems. The partnership is likely to have implications for contractors who serve both airlines. "I think the more you get into common use of facilities -- at Newark and JFK -- the more the tendency is to share ground equipment and possibly cross-lease aircraft," one official said\textsuperscript{18}. The Texas Air-SAS partnership represents the kind of pro-competition linkup favored by Alfred E. Kahn, professor of economics at Cornell University and an architect of U. S. airline deregulation as chairman of the former Civil Aeronautics Board. "It seems to me that it comes close . . . a hopeful sign. SAS is one of those carriers worried about its ability to survive, and it needs passenger traffic feed from the U. S. to compete with Northwest Airlines," Kahn said\textsuperscript{19}. SAS wants to feed the entire United States with direct or one-stop service from each Scandinavian city, and the only way to do this is to connect through a major U. S. hub. SAS’s business strategy to cooperate with a U. S. airline in this

\textsuperscript{18} Aviation Week and Space Technology, October 10, 1988, page 110

\textsuperscript{19} Aviation Week and Space Technology, October 10, 1988, page 110
fashion was given impetus after the Scandinavians failed in their attempt to gain an open competition agreement with the U. S.

The SAS agreement also included an effort by Continental to take advantage of the human resource development expertise at SAS but the aim of the agreement was a schedule coordination through Newark International Airport for easy passenger feed in both directions.

Among other agreements, SAS already has established a hub in Bangkok in cooperation with Thai International and has developed a regional cooperative traffic agreement with Varig at Rio de Janeiro. SAS also tried to establish a southern tier hub in South America with Aerolíneas Argentinas.

Lufthansa's joint ventures include a 25% ownership (with Air France, Iberia and Scandinavian Airlines System) of the Amadeus computer reservations system (CRS) consortium, which extends the German carrier's marketing base. The carrier contributed the Start System, Germany's national CRS, which has 11,000 terminals, to the larger Amadeus network.

Lufthansa shares ownership in smaller carriers (and was seeking more) and also owns hotels, restaurants, cargo services and airport construction companies to broaden its market share.

Thai International's plans for service to the U.S. includes an increase in its daily frequency over the next 2.5 years from the current level of
once-weekly Los Angeles-Seattle-Tokyo-Bangkok and the recently inaugurated twice-weekly Dallas/Ft. Worth-Seattle-Tokyo-Bangkok Boeing 747-200B operations. Thai's objective was to capture market share in the U.S. market. Thai International executives were banking heavily on a turnaround of the U.S. economy under the Reagan Administration, with an attendant strengthening of the U.S. dollar to spur tourism. Healthy economies elsewhere have been reflected in Thai's continued expansion of service. Thai International was optimistic, and in addition to increasing frequencies in the two areas, the West Coast and Texas, they were looking at other points in the U.S. such as Atlanta or Seattle\textsuperscript{20}. Because of the high costs of operations, Thai was looking more at key points where there is good feed.

Thai was also looking at other points for future service. It would like to obtain bilateral rights in South America, with Brazil having a priority. The airline already has rights to Beijing, Shanghai and Canton and expects to inaugurate service to the latter two cities by next April. Thai officials believed that the South Pacific offers excellent potential for development, with possibilities of offering new, relatively unfamiliar points for European tourists.

\textsuperscript{20} Seattle is viewed as a major gateway in the future because of saturation at Los Angeles and San Francisco.
The Thai carrier's fleet expansion plans grow out of an optimistic outlook based on continuing healthy traffic growth in the region and strong evidence that the airline is taking full advantage of it.\textsuperscript{21}

The airline was moving toward self-sufficiency in maintenance and overhaul, both airframe and engines, and expected to reach that goal quickly. For the past five years, it has been progressively taking over major maintenance from the KSSU consortium, and most recently began to handle CF6-50 overhaul on its own -- one of the primary reasons this department exceeded its budget by \$ 16 million last year. According to Thai officials, Thai International spends more on maintenance than U.S. airlines. Since deregulation, they said, U.S. carriers have been spending only what is needed to meet safety requirements, without regard to preserving the value of the equipment. Thai International, as well as other Asian and European carriers, spend more than is required, and as a result their used aircraft command prices sometimes as high as twice the book value.

6.7 All Nippon, TWA and USAir

All Nippon Airlines (ANA), was the Pacific region's leading passenger carrier. It carried a total of 29.6 million international and domestic passengers in 1989 and it was aggressively developing an international route structure. ANA, formerly Japan's primary domestic carrier,

\textsuperscript{21} Thai revenues increased 18\% during its fiscal year ending last Sept. 30, and it recorded a profit of \$57.7 million -- a 49.5\% increase over the previous year and the second greatest in its history. It was the airline's 22nd consecutive profitable year. Traffic increased 6.4\% during that 12 months, and results from the following four months indicated that the 1986-87 financial year could be even better. Traffic increased 14\% during the October-January period, and passenger load factor rose to 67.4\% from 64.2\% during the previous 12 months. The January figure was 71.7\%, and officials were anticipating as much as 73\% for February.
holds 50% of the Japanese domestic air travel market. Japan has the third largest home air travel market in the world after the US and Soviet Union. The carrier's mid-term strategy was to establish a basic international route structure to North America, Europe and Southeast Asia and increase frequencies. All Nippon estimates the passenger growth in 2.75 annual percent, to 3.3 million passengers, by 1995. Although the carrier now serves 22 foreign cities with 67 weekly flights, the lack of landing slots at Japan's major airports hampered further expansion. ANA began international operations in 1986 after Japan liberalized its airline market. To sidestep slot restrictions and continue international growth, the carrier has entered commercial alliances with several foreign airlines. These included operations of joint, and potentially, code-sharing flights. All Nippon has purchased 9% of Austrian Airlines, a strategic hub for service to Eastern Europe.

ANA has joint services with Scandinavian Airlines System, Sabena of Belgium, Aeroflot and Malaysia Airlines. The programs also provided solutions to aircrew and aircraft shortages, but in their opinion such marketing alliances will not continue forever. As traffic develops and new airport slots open it's quite likely the airlines will separate.

All Nippon's long-term policy was to provide air services with its own aircraft and crews. The airline's stake in Vienna-based Austrian Airlines gave it a strategic foothold in bordering Eastern European countries. ANA regards Vienna as a gateway to Eastern Europe. Because of the dramatic political changes in Eastern Europe, ANA
valued Vienna's gateway highly. The hub also could serve as a way point for service to Europe's smaller cities if onward flights within the Common Market are prohibited by planned unification there in 1992. The investment in Austrian Airlines was a long-term project as lack of hotel, business and tourist infrastructure in Eastern Europe will restrict initial growth.

A planned code-sharing agreement with USAir will extend All Nippon's daily Tokyo-Washington, D. C., to Orlando, Fla., service. A USAir flight will fly the final leg. Departure and arrival times will be coordinated with All Nippon's Tokyo service, with All Nippon purchasing blocked space on the flights. Passengers using the flight must check in only once. Both airlines may use the code-sharing agreement as a base for further cooperation, including additional flight coordination between Japan and Florida. All Nippon's five-year plan also calls for the carrier to inaugurate additional scheduled international service from Japan's secondary airports such as Nagoya and Fukuoka. A Nagoya-Kuala Lumpur route was started in October, 1990. Similar routes are planned between Fukuoka and Bangkok and Nagoya and Honolulu later this year.

USAir has one of the highest cost structures of any major U. S. airlines. Traditionally, this had been offset by high yields, or revenue per seat miles. In this situation, union cooperation was crucial. Some actions can be taken unilaterally by management, but without labor agreement it is difficult to improve the cost structure. The nature of
USAir operation, which is so short-haul, forced the airline to go to a Southwest (Airlines) type of cost structure.\footnote{Southwest found its niche with low-frills service, relatively low labor costs and a lack of some amenities such as baggage interline agreements that passengers on other carriers take for granted.}

Another USAir strength is the distribution of revenues throughout the carrier's route structure. An Avitas\footnote{Aviation Week and Space Technology, October 21, 1991, page 28} study found the USAir revenue base was spread among more route segments than that of any other major carrier. The study, based on 1990 performance, analyzed the number of domestic route segments that generate 25\%, 50\%, and 75\% of a given airline's total revenue. The results showed some of the weaker airlines, such as Pan Am and TWA, generate 25\% of their revenue from a surprisingly small number of routes. For Pan Am it was 4-5, for TWA 10-11. Eastern Airlines fell into the same category, with just 10 routes generating 25\% of total revenue. In contrast, USAir relied on about 49 routes to produce 25\% of its revenue. The Pan Am/TWA model leaves those airlines vulnerable, because if something goes wrong on just a few routes -- such as unexpectedly stiff competition -- a carrier can lose a disproportionate share of its income. But an unexpected loss on any of USAir's routes would be less damaging, because each route segment generates a comparatively small portion of total revenues.

With its weak international route structure and computer marketing capability, USAir ironically may have been in worse shape than
TWA. TWA's only strengths were its international route structure and computer reservations system.
7. DATA AND METHODOLOGY

The data for this study were the strategic linkages between pairs of airline companies before January 1991. It includes the names of airlines, the type of linkage (e.g. route or cargo agreement, wide marketing alliance, joint venture or equity holding). The complete database includes 356 linkages among 140 airlines.

The data for each linkage was obtained mainly from industry and press journals (primarily Aviation Week and Space Technology, Air Transport World and other sources).

I restricted the study to the cooperative arrangements involving the 29 largest airlines ranked by revenue kilometers per passenger according to a ICAO statistic (1990) (see exhibit 1). I have used a cut off of 15,000 revenue kilometers per passenger but I have also included two more airlines, Varig and Air New Zealand, that do not reach the cut-off target but were both important for different reasons. Among the 29 airlines I found two hundred and eighteen (218) out of the three hundred and fifty six (356) alliances. By studying the top 29 airlines (20 % of the airlines) I covered eighty one percent (81.3 %) of the linkages. I used those 29 airlines to construct the adjacency matrix.

In order to evaluate the asset specificity and interdependence of each individual linkage, I assumed that asset specificity and interdependence are directly related to organizational form. Stronger linkages -- mergers,

---

24 Varig is larger than JAL, SAS or Thai in terms of capacity; Air New Zealand is the fourth airline ranked by capacity, is a major force in the region and has been very active in developing alliances.
acquisitions, majority equity holdings and minority cross equity agreements-- are very costly to undertake organizationally, therefore partners will try to benefit from them through business cooperation which implies asset specificity. I adapted Nohria and García-Pont's rating (1991) to indicate the strength of the link in the airline industry. Thus, I classified the agreements as follows:

Table 7.1 - Rating of the strength of the relationship

<table>
<thead>
<tr>
<th>INTERDEPENDENCE</th>
<th>TYPE OF LINK</th>
<th>STRENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Owner</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Majority Equity Holding (&gt;50%)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Crossequity</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Minority Equity Holding (0-50%)</td>
<td>4</td>
</tr>
<tr>
<td>Intermediate</td>
<td>Management Contract</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Wide Marketing Agreement</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Joint Venture</td>
<td>2</td>
</tr>
<tr>
<td>Low</td>
<td>Route or Market Specific</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Cargo Alliance</td>
<td>1</td>
</tr>
</tbody>
</table>

Network analysis most frequently employs binary adjacency matrixes, with 1 indicating the presence of a link, and 0 its absence. But in the case of strategic linkages, however, it is hard to justify treating all relationships the same. An acquisition is not the same as a mere route agreement, and should be treated in a different way in a relationship network. Furthermore, the ease of reversibility of the link is likely to depend on its organizational form.

In putting together the adjacency matrix I adopted a similar methodology to that of Nohria and García-Pont (1991). I chose a
symmetric matrix with $A_{ij} = A_{ji}$ representing the strength of the linkage between firm $i$ and firm $j$. When firms had multiple linkages I choose $A_{ij}$ to represent the strongest link between them. The diagonal cell in the matrix was assigned a value of 5, so that the strongest relationship is that of the firm with itself. The resulting matrix was the input for the network analysis.

To identify the strategic block structure in the industry through blockmodelling I used the CONCOR algorithm which has been recently applied to the study of cooperative agreements (Nohria and García-Pont, 1991). CONCOR produces a bipartition of the set of actors in the network. The algorithm is then applied repeatedly at the discretion of the researcher to produce a classification of the actors into structurally equivalent blocks. The researcher's judgment is called upon with regard to the final partition of the actors.
8. CONCLUSION

This thesis has attempted two different objectives. First, I have made an analysis of the airline industry in an attempt to specify which kinds of strategic capabilities are shared or traded through inter-organizational linkages, specifically through alliances. The analysis of the industry structure combined with a qualitative description of the alliances indicates that a major force in deciding strategic alliances was the airlines desired to increase their networks and enhance their route structure.

Second, I provided a preliminary run of the methodology developed by Nohria and García-Pont (1991) to analyze strategic blocks. The results obtained suggest that this method could give us an additional understanding of the structure of the blocks and the logic of the alliances.

In order to continue in the same line of analysis I will suggest that data regarding the airline route structure must be collected and included in the model. Specifically, for each airline the data must include the following: (a) flights between two countries (which will be the base to get data aggregate by region), and (b) frequency of those flights. This data will provide the base for a more quantitative approach towards the analysis of the route structure.

Finally, I believe that the study of the airline industry through the strategic block approach developed by Nohria and García-Pont's will provide another opportunity to test the generality of model, which has been useful in gaining knowledge about the Auto and European Banking industries.
### Exhibit 1 - Top 29 Airlines

Ranked by Revenue Passenger per Kilometer (RPK)

<table>
<thead>
<tr>
<th>#</th>
<th>AIRLINE</th>
<th>Region</th>
<th>Pass '000</th>
<th>Share %</th>
<th>RPK millions</th>
<th>All T millions</th>
<th>Av T millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aeroflot</td>
<td>EUR</td>
<td>131,420</td>
<td>24.06%</td>
<td>226,734</td>
<td>23,693</td>
<td>33,768</td>
</tr>
<tr>
<td>2</td>
<td>American Airlines</td>
<td>USM</td>
<td>72,471</td>
<td>9.74%</td>
<td>118,223</td>
<td>12,025</td>
<td>22,371</td>
</tr>
<tr>
<td>3</td>
<td>United</td>
<td>USM</td>
<td>55,153</td>
<td>7.41%</td>
<td>112,049</td>
<td>12,088</td>
<td>20,496</td>
</tr>
<tr>
<td>4</td>
<td>Delta</td>
<td>USM</td>
<td>68,258</td>
<td>9.17%</td>
<td>95,554</td>
<td>9,781</td>
<td>17,562</td>
</tr>
<tr>
<td>5</td>
<td>Northwest</td>
<td>USM</td>
<td>38,860</td>
<td>5.22%</td>
<td>75,863</td>
<td>9,491</td>
<td>16,701</td>
</tr>
<tr>
<td>6</td>
<td>Continental</td>
<td>USM</td>
<td>35,150</td>
<td>4.72%</td>
<td>62,384</td>
<td>6,584</td>
<td>13,021</td>
</tr>
<tr>
<td>7</td>
<td>British Airways</td>
<td>EUR</td>
<td>24,008</td>
<td>4.40%</td>
<td>60,525</td>
<td>8,094</td>
<td>12,028</td>
</tr>
<tr>
<td>8</td>
<td>TWA</td>
<td>USM</td>
<td>25,189</td>
<td>3.38%</td>
<td>56,402</td>
<td>6,159</td>
<td>11,224</td>
</tr>
<tr>
<td>9</td>
<td>Japan Airlines (JAL)</td>
<td>A&amp;P</td>
<td>21,953</td>
<td>6.87%</td>
<td>53,329</td>
<td>8,563</td>
<td>3,632</td>
</tr>
<tr>
<td>10</td>
<td>Pan Am</td>
<td>USM</td>
<td>17,383</td>
<td>2.34%</td>
<td>47,721</td>
<td>5,882</td>
<td>9,291</td>
</tr>
<tr>
<td>11</td>
<td>USAir</td>
<td>USM</td>
<td>44,494</td>
<td>5.98%</td>
<td>40,438</td>
<td>3,871</td>
<td>7,486</td>
</tr>
<tr>
<td>12</td>
<td>Air France</td>
<td>EUR</td>
<td>16,095</td>
<td>2.95%</td>
<td>36,815</td>
<td>6,661</td>
<td>10,159</td>
</tr>
<tr>
<td>13</td>
<td>Lufthansa</td>
<td>EUR</td>
<td>18,759</td>
<td>3.43%</td>
<td>36,169</td>
<td>7,471</td>
<td>11,059</td>
</tr>
<tr>
<td>14</td>
<td>Singapore (SIA)</td>
<td>A&amp;P</td>
<td>6,649</td>
<td>2.08%</td>
<td>30,466</td>
<td>4,596</td>
<td>6,168</td>
</tr>
<tr>
<td>15</td>
<td>Qantas</td>
<td>A&amp;P</td>
<td>3,939</td>
<td>1.23%</td>
<td>26,205</td>
<td>3,382</td>
<td>4,829</td>
</tr>
<tr>
<td>16</td>
<td>KLM</td>
<td>EUR</td>
<td>6,540</td>
<td>1.20%</td>
<td>25,030</td>
<td>4,391</td>
<td>6,056</td>
</tr>
<tr>
<td>17</td>
<td>Air Canada</td>
<td>CAN</td>
<td>11,337</td>
<td>1.52%</td>
<td>22,812</td>
<td>2,861</td>
<td>5,199</td>
</tr>
<tr>
<td>18</td>
<td>Iberia</td>
<td>EUR</td>
<td>15,503</td>
<td>2.84%</td>
<td>21,934</td>
<td>2,649</td>
<td>4,210</td>
</tr>
<tr>
<td>19</td>
<td>Cathay Pacific</td>
<td>A&amp;P</td>
<td>6,877</td>
<td>2.15%</td>
<td>21,544</td>
<td>3,363</td>
<td>4,695</td>
</tr>
<tr>
<td>20</td>
<td>All Nippon</td>
<td>A&amp;P</td>
<td>29,693</td>
<td>9.29%</td>
<td>21,465</td>
<td>2,145</td>
<td>3,914</td>
</tr>
<tr>
<td>21</td>
<td>Eastern</td>
<td>USM</td>
<td>14,465</td>
<td>1.94%</td>
<td>18,652</td>
<td>1,857</td>
<td>3,579</td>
</tr>
<tr>
<td>22</td>
<td>Alitalia</td>
<td>EUR</td>
<td>10,311</td>
<td>1.89%</td>
<td>17,679</td>
<td>2,720</td>
<td>4,015</td>
</tr>
<tr>
<td>23</td>
<td>Canadian</td>
<td>CAN</td>
<td>7,675</td>
<td>1.03%</td>
<td>17,520</td>
<td>2,076</td>
<td>3,669</td>
</tr>
<tr>
<td>24</td>
<td>Korean Air</td>
<td>A&amp;P</td>
<td>11,235</td>
<td>3.51%</td>
<td>17,509</td>
<td>3,982</td>
<td>5,243</td>
</tr>
<tr>
<td>25</td>
<td>Thai Intl.</td>
<td>A&amp;P</td>
<td>5,723</td>
<td>1.79%</td>
<td>16,394</td>
<td>2,102</td>
<td>3,089</td>
</tr>
<tr>
<td>26</td>
<td>Swissair</td>
<td>EUR</td>
<td>7,673</td>
<td>1.40%</td>
<td>15,391</td>
<td>2,437</td>
<td>3,682</td>
</tr>
<tr>
<td>27</td>
<td>SAS</td>
<td>EUR</td>
<td>13,972</td>
<td>2.56%</td>
<td>15,256</td>
<td>1,857</td>
<td>3,019</td>
</tr>
<tr>
<td>28</td>
<td>Varig</td>
<td>LAC</td>
<td>6,300</td>
<td>7.20%</td>
<td>13,667</td>
<td>2,074</td>
<td>3,896</td>
</tr>
<tr>
<td>29</td>
<td>Air New Zealand</td>
<td>A&amp;P</td>
<td>4,509</td>
<td>1.41%</td>
<td>10,096</td>
<td>12,800</td>
<td>20,458</td>
</tr>
</tbody>
</table>

Source: ICAO Digest of Statistics - TRAFFIC (Series T) - 1990

**Codes:**
- (#) Rank by Revenue Passenger per Km
- (Pass) Passengers Carried
- (Share) Market Share by Region
- (RPK) Revenue Passenger per Km
- (All T) Total Ton. (passenger + freight) carried
- (Av T) Available Ton. (capacity)
Exhibit 2 - Airlines Statistics by Block

Ranked by Market Share

<table>
<thead>
<tr>
<th>BL REG #</th>
<th>AIRLINE</th>
<th>Air Pass Share (millions)</th>
<th>RPM Share (%)</th>
<th>AVT Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EUR 1 Aeroflot</td>
<td>146.80</td>
<td>103.42</td>
<td>24.06%</td>
</tr>
<tr>
<td>2</td>
<td>USM 2 American Airlines</td>
<td>138.70</td>
<td>97.71</td>
<td>25.73%</td>
</tr>
<tr>
<td>3</td>
<td>CAN 3 Cathay Pacific</td>
<td>120.60</td>
<td>72.67</td>
<td>20.45%</td>
</tr>
<tr>
<td>4</td>
<td>EUR 4 United</td>
<td>108.40</td>
<td>68.12</td>
<td>17.00%</td>
</tr>
<tr>
<td>5</td>
<td>USM 5 U.S. Air</td>
<td>92.60</td>
<td>62.25</td>
<td>15.00%</td>
</tr>
<tr>
<td>6</td>
<td>EUR 6 British Airways</td>
<td>85.20</td>
<td>56.78</td>
<td>14.00%</td>
</tr>
<tr>
<td>7</td>
<td>EUR 7 Continental</td>
<td>78.40</td>
<td>51.25</td>
<td>13.00%</td>
</tr>
<tr>
<td>8</td>
<td>A&amp;P 8 All Nippon</td>
<td>71.60</td>
<td>46.25</td>
<td>12.00%</td>
</tr>
<tr>
<td>9</td>
<td>USM 9 US Airways</td>
<td>65.00</td>
<td>41.25</td>
<td>11.00%</td>
</tr>
<tr>
<td>10</td>
<td>EUR 10 Singapore</td>
<td>58.40</td>
<td>36.75</td>
<td>9.00%</td>
</tr>
<tr>
<td>11</td>
<td>EUR 11 Korean Air</td>
<td>51.60</td>
<td>32.50</td>
<td>8.00%</td>
</tr>
<tr>
<td>12</td>
<td>EUR 12 Lufthansa</td>
<td>44.80</td>
<td>28.75</td>
<td>7.00%</td>
</tr>
<tr>
<td>13</td>
<td>EUR 13 Air France</td>
<td>38.00</td>
<td>24.00</td>
<td>6.00%</td>
</tr>
<tr>
<td>14</td>
<td>EUR 14 SAS</td>
<td>31.20</td>
<td>18.50</td>
<td>5.00%</td>
</tr>
<tr>
<td>15</td>
<td>EUR 15 Qantas</td>
<td>24.40</td>
<td>15.00</td>
<td>4.00%</td>
</tr>
<tr>
<td>16</td>
<td>EUR 16 Austrian Airlines</td>
<td>17.60</td>
<td>10.50</td>
<td>3.00%</td>
</tr>
<tr>
<td>17</td>
<td>EUR 17 TWA</td>
<td>10.80</td>
<td>6.00</td>
<td>2.00%</td>
</tr>
<tr>
<td>18</td>
<td>EUR 18 Swissair</td>
<td>6.00</td>
<td>3.00</td>
<td>1.00%</td>
</tr>
<tr>
<td>19</td>
<td>EUR 19 All Nippon</td>
<td>2.40</td>
<td>1.50</td>
<td>0.50%</td>
</tr>
<tr>
<td>20</td>
<td>EUR 20 All Nippon</td>
<td>1.20</td>
<td>0.75</td>
<td>0.25%</td>
</tr>
</tbody>
</table>

*Source: ICAO Digest of Statistics - TRAFFIC (Series T), 1991*
<table>
<thead>
<tr>
<th>BL REG</th>
<th>#</th>
<th>AIRLINE</th>
<th>Rev millions</th>
<th>Assets millions</th>
<th>Rev cents-km</th>
<th>Exp cents-km</th>
<th>#Emp</th>
<th>#Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUR</td>
<td>1</td>
<td>Aeroflot</td>
<td>$1,656</td>
<td>$1,292</td>
<td>87.00 €</td>
<td>26.50 €</td>
<td>400,000</td>
<td>2,442</td>
</tr>
<tr>
<td>USM</td>
<td>13</td>
<td>Pan Am</td>
<td>$3,612</td>
<td>$2,350</td>
<td>64.20 €</td>
<td>42.00 €</td>
<td>27,769</td>
<td>163</td>
</tr>
<tr>
<td>CAN</td>
<td>21</td>
<td>Canadian</td>
<td>$17,419</td>
<td>$1,485</td>
<td>77.00 €</td>
<td>43.40 €</td>
<td>16,877</td>
<td>87</td>
</tr>
<tr>
<td>USM</td>
<td>2</td>
<td>American Airlines</td>
<td>$9,961</td>
<td>$10,229</td>
<td>82.80 €</td>
<td>41.20 €</td>
<td>75,086</td>
<td>500</td>
</tr>
<tr>
<td>LAC</td>
<td>26</td>
<td>Varig</td>
<td>$1,405</td>
<td>$5,551</td>
<td>64.80 €</td>
<td>36.10 €</td>
<td>24,179</td>
<td>69</td>
</tr>
<tr>
<td>A&amp;P</td>
<td>11</td>
<td>Japan Airlines (JAL)</td>
<td>$6,937</td>
<td>$8,329</td>
<td>82.10 €</td>
<td>52.40 €</td>
<td>20,894</td>
<td>92</td>
</tr>
<tr>
<td>A&amp;P</td>
<td>23</td>
<td>Cathay Pacific</td>
<td>$1,846</td>
<td>$3,081</td>
<td>59.40 €</td>
<td>32.30 €</td>
<td>10,142</td>
<td>30</td>
</tr>
<tr>
<td>CAN</td>
<td>18</td>
<td>Air Canada</td>
<td>$2,323</td>
<td>$2,581</td>
<td>77.00 €</td>
<td>43.40 €</td>
<td>23,211</td>
<td>116</td>
</tr>
<tr>
<td>A&amp;P</td>
<td>28</td>
<td>Air New Zealand</td>
<td>$1,014</td>
<td>$1,034</td>
<td>76.40 €</td>
<td>48.50 €</td>
<td>8,668</td>
<td>38</td>
</tr>
<tr>
<td>A&amp;P</td>
<td>29</td>
<td>Qantas</td>
<td>$2,478</td>
<td>$2,013</td>
<td>62.60 €</td>
<td>42.20 €</td>
<td>17,481</td>
<td>40</td>
</tr>
<tr>
<td>USM</td>
<td>4</td>
<td>United</td>
<td>$9,642</td>
<td>$7,229</td>
<td>76.40 €</td>
<td>44.80 €</td>
<td>65,099</td>
<td>429</td>
</tr>
<tr>
<td>EUR</td>
<td>15</td>
<td>Iberia</td>
<td>$2,840</td>
<td>$2,135</td>
<td>113.90 €</td>
<td>66.60 €</td>
<td>28,003</td>
<td>84</td>
</tr>
<tr>
<td>EUR</td>
<td>20</td>
<td>Alitalia</td>
<td>$2,064</td>
<td>$2,458</td>
<td>83.40 €</td>
<td>53.50 €</td>
<td>18,191</td>
<td>72</td>
</tr>
<tr>
<td>USM</td>
<td>3</td>
<td>Delta</td>
<td>$8,648</td>
<td>$6,559</td>
<td>88.40 €</td>
<td>45.40 €</td>
<td>60,413</td>
<td>407</td>
</tr>
<tr>
<td>EUR</td>
<td>10</td>
<td>British Airways</td>
<td>$6,857</td>
<td>$6,145</td>
<td>92.20 €</td>
<td>56.30 €</td>
<td>48,170</td>
<td>200</td>
</tr>
<tr>
<td>A&amp;P</td>
<td>24</td>
<td>Singapore (SIA)</td>
<td>$2,165</td>
<td>$3,371</td>
<td>50.90 €</td>
<td>31.00 €</td>
<td>11,604</td>
<td>35</td>
</tr>
<tr>
<td>EUR</td>
<td>22</td>
<td>Swissair</td>
<td>$2,807</td>
<td>$3,631</td>
<td>114.90 €</td>
<td>74.70 €</td>
<td>14,296</td>
<td>54</td>
</tr>
<tr>
<td>USM</td>
<td>6</td>
<td>Northwest</td>
<td>$6,554</td>
<td>$5,537</td>
<td>68.50 €</td>
<td>57.10 €</td>
<td>21,983</td>
<td>326</td>
</tr>
<tr>
<td>A&amp;P</td>
<td>19</td>
<td>Korean Air</td>
<td>$2,120</td>
<td>$2,924</td>
<td>64.10 €</td>
<td>50.60 €</td>
<td>1,220</td>
<td>59</td>
</tr>
<tr>
<td>USM</td>
<td>16</td>
<td>Eastern</td>
<td>$1,552</td>
<td>$3,281</td>
<td>83.30 €</td>
<td>67.30 €</td>
<td>15,469</td>
<td>191</td>
</tr>
<tr>
<td>EUR</td>
<td>25</td>
<td>KLM</td>
<td>$2,728</td>
<td>$5,068</td>
<td>66.60 €</td>
<td>44.30 €</td>
<td>22,814</td>
<td>49</td>
</tr>
<tr>
<td>USM</td>
<td>7</td>
<td>Continental</td>
<td>$4,944</td>
<td>$3,934</td>
<td>73.90 €</td>
<td>36.30 €</td>
<td>30,217</td>
<td>384</td>
</tr>
<tr>
<td>EUR</td>
<td>12</td>
<td>Lufthansa</td>
<td>$6,284</td>
<td>$5,531</td>
<td>90.80 €</td>
<td>59.20 €</td>
<td>40,684</td>
<td>131</td>
</tr>
<tr>
<td>EUR</td>
<td>14</td>
<td>Air France</td>
<td>$4,506</td>
<td>$3,645</td>
<td>71.10 €</td>
<td>43.30 €</td>
<td>37,122</td>
<td>105</td>
</tr>
<tr>
<td>EUR</td>
<td>17</td>
<td>SAS</td>
<td>$3,180</td>
<td>$3,377</td>
<td>184.50 €</td>
<td>109.20 €</td>
<td>19,975</td>
<td>109</td>
</tr>
<tr>
<td>A&amp;P</td>
<td>27</td>
<td>Thai Intl</td>
<td>$1,417</td>
<td>$2,249</td>
<td>72.00 €</td>
<td>39.50 €</td>
<td>13,552</td>
<td>42</td>
</tr>
<tr>
<td>A&amp;P</td>
<td>8</td>
<td>All Nippon</td>
<td>$4,482</td>
<td>$6,007</td>
<td>179.90 €</td>
<td>84.60 €</td>
<td>12,193</td>
<td>105</td>
</tr>
<tr>
<td>USM</td>
<td>5</td>
<td>USAir</td>
<td>$4,021</td>
<td>$6,050</td>
<td>107.90 €</td>
<td>58.90 €</td>
<td>34,807</td>
<td>441</td>
</tr>
<tr>
<td>USM</td>
<td>9</td>
<td>TWA</td>
<td>$4,507</td>
<td>$3,841</td>
<td>73.00 €</td>
<td>39.80 €</td>
<td>32,677</td>
<td>213</td>
</tr>
</tbody>
</table>

* Source: ICAO Digest of Statistics - TRAFFIC (Series T), 1991
Exhibit 3 - ATLAS Consortia

The wide bodied airliners like the Boeing 747 during the late 60's and early 70's have dictated much of the structure of the overhaul and maintenance business in Europe. Many leading airlines such as Air France, KLM and Lufthansa recognized that providing the support facilities for such aircraft would prove prohibitively expensive. For this reason many of Western Europe's major airlines decided to create overhaul maintenance which would spread the cost of the capital outlay by allowing individual members to specialize.

The ATLAS group of five European air carriers -- Air France, Alitalia, Iberia, Lufthansa and Sabena -- has signed an updated maintenance and training agreement to adapt to anticipated changes in the European market and to accommodate new aircraft. The ATLAS airlines updated their cooperative agreement to permit "greater flexibility, cost efficiency and quality assurance" in coping with the increasingly competitive and rapidly changing airline business, according to the group. ATLAS was formed by four of the airlines in 1969 to help spread the costs of spare parts and maintenance among the members for the then-new Boeing 747 transport. Iberia, the fifth airline, joined ATLAS in 1972. The introduction of the first wide-body aircraft into their fleets presented the airlines with a financial burden. The partnership was formed to gain cost benefits from sharing joint specifications for new aircraft, maintenance and overhauls, and spare parts inventories -- including engines, training and route documentation. The airlines expanded the agreement as they added additional wide-body aircraft types. The ATLAS airlines now cooperate on maintenance and training activities for the 747, McDonnell
Douglas DC-10 and Airbus Industries A300, A300-600 and A310. The only non-wide-body aircraft, the Concorde, was dropped from ATLAS activities when Air France became the only operator. More than 200 aircraft currently are covered by the program. For example, Air France performs 747 maintenance, supported by Iberia. DC-10 simulator training is done at Sabena. DC-10 maintenance is performed by Alitalia, and Lufthansa handles A300 and A300-600 maintenance and overhauls. Lufthansa also performs some of the group's engine work at its facility in Hamburg and will add 747 activities as the ATLAS 747 fleet grows. The ATLAS agreement soon will cover maintenance activities for the new Boeing 747-400 series as airlines begin receiving the type this year and the A340 when deliveries begin in 1992.

Within ATLAS, Air France is the central agency for the Boeing 747 airframe with Iberia providing a production center; Alitalia is the agency for the DC-10; Lufthansa is the agency for the Airbus A300, with Air France providing a production center; and Sabena is the central agency for the Airbus A310. Within the consortium, individual airlines have responsibility not only for various engines but also for specific models of those engines. Consequently, Lufthansa is the central agency for the JT9D-7A, Iberia is responsible for the JT9D-7Q, and Sabena is responsible for JT9D-7R. Sabena also is responsible for most auxiliary power units except the APU 700, which is Alitalia's responsibility. Component work in ATLAS is divided fairly evenly with Air France, Alitalia and Sabena holding responsibility for the Boeing 747, while Alitalia, Iberia, Lufthansa and Sabena are responsible for the DC-10, A300 and A310.
Clearly the collective and individual facilities of the partners have made them attractive to third parties and during the 1970s business steadily increased. The ATLAS consortium, for example, spends 313,000 man-hours per year on airframe work for non-associated third parties, with the majority of the work on Boeing 747s. A further 553,500 man-hours per year are spent on engines and when component and APU work is taken into account, the total expenditure in time is 616,720 man-hours per year.
Exhibit 4 - KSSU Consortia

In KSSU, KLM is the central agency for the General Electric CF6. Indeed it has the largest overhaul center for this engine outside the United States. SAS has responsibility for the JT9. UTA is responsible for undercarriages of wide-body aircraft as well as for overhauling APU's. This policy of specialization has meant that the individual airlines have needed relatively small outlays in plant and equipment while developing an unrivaled expertise in specific areas.

Within KSSU, individual airlines will obtain work and then allocate specialist activity among the remainder of the consortium. A typical example was the success, a few years ago, of KLM in winning a general overhaul contract from Bangladesh Biman for its DC-10 Series 30s. While much of this work is carried out by the KLM workshops, Swissair has responsibility for the general overhaul of the fuselage. A wide variety of facilities are now available from KSSU, ranging from a complete overhaul and maintenance package to engine overhaul to the provision of maintenance personnel in Dhaka. Long term contracts are held with airlines such as VIASA, AVIANCA, Cargolux Airlines International and Garuda Indonesian Airways. Yet individual airlines have also profited from this business. British Airways confirmed its third party business had increased over recent years providing considerable revenue but was neither able to quantify the figure nor to give a value for the business. The airline operates in a slightly different way than the consortia in that its facilities are primarily for its own fleet and the third party business is used to take up any slack. Because the airline offers very high standards (being approved by the FAA, the CAA and the British Ministry of Defense) and
guaranteed turn-around times, more than 100 airlines and operators have
used its Heathrow-based facilities. A bonus for BA customers is the fact
that because Heathrow is the world's busiest international airport there is
no "dead-leg" flying required. BA also provides maintenance personnel
for overseas customers on ad hoc basis or provides teams on contract. An
added bonus is the availability of a team of up to 80 maintenance engineers
on permanent standby for short notice casualty work. With BA due to
merge with British Caledonia (BCal), both companies' overhaul and
maintenance organization face rationalization. In fact, BCal began
marketing their Gatwick facilities, which include five wide-body cells, less
than five years ago. While many customers, such as Virgin Atlantic and
Air Europe, are Gatwick users, this is not universally the case for other
customers which include Hapag Lloyd (Airbus 300) and Continental
Airlines (DC-10). The reason why the new and relatively small, operation
has become, in the words of a BCal spokesman, "a major source of
revenue" is the high level of experience it gained with its own fleet and its
ability to handle almost anything. This success is helped by the growth of
independent specialized companies dealing, for example, with
undercarriages for wide-bodied airliners while others have become experts
in specific systems or subsystems. The relatively large number of such
companies means competitive terms can be arranged. Companies which
specialize and identify a niche in the market are clearly going to be an
ever-growing sector over the next few years. A typical example is FFV
Aerotech, based at Arboga in Sweden. This company has focused upon
gene overhauls and in the commercial market, concentrates upon Allison
250 and Rolls-Royce Gnome 1200/1400 turboshfts as well as both turbo-
prop and turboshft versions of the General Electric CT6. The business
has developed because helicopter and small fixed wing operators often cannot afford to provide major maintenance and overhaul facilities and must rely upon external, independent organizations. This work is now worth some $17 million a year to FFV which has now established a dedicated workshop for this work. Much of the revenue generated comes from companies in Latin America, the Middle and the Far East, but the Europeans recognize that this happy state of affairs will not last for ever.

Thai Airways International, for example, used to rely upon KLM for all maintenance and overhaul work for their fleet of eight Boeing 747s. Now the Thais have taken over complete responsibility for this work. Many other airlines are likely to follow suit. The European share of the world market may be further reduced by the growing power of Hong Kong organizations like Haco and Singapore Airlines. These organizations have a good reputation for quality; indeed Haco was responsible for furnishing BA's fleet of Boeing 747's and Lockheed Tristars (L110). With the Pacific becoming the focus for world air transport they will obviously be well placed for a growing level of business. ATLAS is competing for its share by seeking both work and partners in the Far East, while other organizations will seek to maintain their high quality and efficiency in order to ensure customers will still come to Europe.
Exhibit 5 - Alitalia & Iberia agreement

Basic elements of the Alitalia/Iberia agreement include:

-- Rome and Madrid are to be recognized as points of embarkation/disembarkation for the two carriers' intercontinental flights to Asian and Central American destinations.

-- Alitalia can block space on Iberia's Italy-Mexico flights and Iberia can do likewise on Alitalia's Spain-Thailand service.

-- The schedules of Alitalia flights to Bangkok and Iberia service to Mexico City will allow transit passengers to make immediate connections in Rome and Madrid.

-- The new services offered by both companies will be promoted by creating and marketing Italian and Spanish tour packages targeted at both the Far East and South American markets.

-- Passenger transit operations on the cooperative service will be made easier through the setting up of special transit areas in the terminal. Iberia Director General Francisco Escartí Carbonell said the resulting cooperation between Alitalia and Iberia should boost the competitive positions of the two airlines. "This will increase our competitive position because we can offer a joint product at a good price by operating together."
Exhibit 6 - Alitalia & USAir agreement

Main elements of the agreement include:

-- USAir will focus on providing connecting service for Alitalia at Boston, Los Angeles and Miami to about 40 cities in the U. S.

-- Alitalia/USAir code-sharing flights will be operated from Rome and Milan to Philadelphia and Washington, D. C., using Alitalia aircraft. Airline officials said USAir is the leading carrier in terms of aircraft departures from these airports, providing solid passenger feed to Alitalia's transatlantic service.

-- Alitalia passengers flying with first, business and full-fare coach tickets will be able to fly first class on USAir and use the airline's VIP lounges.

-- USAir frequent flier miles can be logged by North American passengers flying Alitalia on transatlantic routes.

-- USAir and Alitalia will work together in the cargo sector.

-- The two airlines will establish joint working groups to improve integration of services at their current and future gateways in the U. S. At the present there are no current plans for the airlines to acquire a financial stake in one another.
Exhibit 7 - SAS & Texas Air agreement

Under the SAS-Texas Air agreement:

- SAS will purchase a 10% equity stake in Texas Air common stock, approximately 4 million shares, within six months.

- SAS's $50-million access fee will be paid in three installments: $25 million will be paid immediately to Texas Air; $15 million to Continental, and $10 million to Eastern Airlines. SAS will have access to three gates at Newark International Airport's new Terminal C. It also will have access to Eastern's proposed new facility at John F. Kennedy International Airport in 1991.
Exhibit 8 - An Outlook at the Airline Industry

Based on traffic trends over the last decade, passenger traffic will rise at an average annual rate of 6% through the year 2000. International traffic will outpace domestic traffic in terms of actual passenger kilometers in the latter part of the decade. Cargo traffic will rise 7% per year.

Table A7.1 - Scheduled Passenger Traffic to Year 2000

<table>
<thead>
<tr>
<th>Passenger/Kilometers (Billions)</th>
<th>Actual</th>
<th>Forecast</th>
<th>Average Annual Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduled Services</td>
<td>937</td>
<td>1,696</td>
<td>3,450</td>
</tr>
<tr>
<td>International</td>
<td>385</td>
<td>756</td>
<td>1,740</td>
</tr>
<tr>
<td>Domestic</td>
<td>552</td>
<td>940</td>
<td>1,710</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Passengers Carried (Millions)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduled Services</td>
<td>679</td>
<td>1,072</td>
<td>1,945</td>
</tr>
<tr>
<td>International</td>
<td>143</td>
<td>232</td>
<td>480</td>
</tr>
<tr>
<td>Domestic</td>
<td>536</td>
<td>840</td>
<td>1,465</td>
</tr>
</tbody>
</table>

*Preliminary. + Rounded to the nearest 0.5 percentage point. Source: ICAO

ICAO projected these growth figures based on trends going back three decades:

-- Air traffic grew 13% per year between 1960 and 1973 as the world economy grew by an average annual rate of 5% in real terms.

-- In the 1973-88 period, the growth of the world economy was nearly halved to 2.8% per year in real terms and air traffic growth was 7% per year, about half of the growth rate of the earlier period.

The 1990s will bring more fundamental change to world airlines than any other decade since the 1960s when jet power transformed the
industry\textsuperscript{25}. In addition, deregulation has freed the airlines to respond to markets just like any other business.

Today these airlines are heading toward new relationships with governments. Commercial aviation's historic dependence on intergovernment bilaterals -- aviation trade agreements -- will begin to crumble in the 1990s as nations begin merging under regional economic entities, such as the European Community. Multilateral regional agreements will fill the gaps, but only after much diplomatic agony over issues of state sovereignty. Governments are divided over whether aviation rights should be governed by the General Agreement on Tariffs and Trade (GATT) or whether to continue their negotiation of aviation rights as a distinct service. It is difficult to predict the outcome of this debate, but in the tumultuous world of international aviation that is coming in the 1990s, anything can happen. The national character of some larger airlines will be minimized over the next decade as they become more accepted as world corporations backed by international financing. National limits on foreign ownership of carriers are likely to fall. The division between "haves" and "have-nots" among world carriers, as old as aviation itself, will sharpen under this globalization trend.

Changes in the structure of the world airline industry will be evolutionary. Airlines have been increasing in number, possibly a result of deregulation. According to the International Civil Aviation Organization, scheduled airlines increased from 236 in 1978 to 343 in

\textsuperscript{25} Jets made air travel more efficient and created a new form of mass transportation.
1988. The world fleet increased from 6,130 aircraft to 7,300 in that period, and the percentage of large jet transports in this fleet rose from 92.7% to 96.3%. As deregulation spreads around the world, the number of airlines will increase. The number of world airline employees, which grew from 953,500 in 1978 to 1.15 million in 1988, will continue to rise in an upward swing. The world's airlines, which carried more than 1 billion passenger in 1987, are carrying a fifth of the world's population each year. In an industry anticipating a doubling of air traffic between now and 2000 there would be a need for more personnel (both workers and managers). Airlines will add 600-700 aircraft a year to the fleet through the year 2000, based on orders and options already placed for new aircraft. These orders represent an unprecedented vote of confidence in the future of commercial aviation. Aircraft deliveries are more concentrated in the early years of the decade, placing high demand on skilled maintenance and flight crew personnel. Such a hardware expansion has implications for hiring and training, as well as for an expansion of aircraft maintenance and other facilities.

The 1990s will bring to an end to the decade-long trend toward lower fares in the world market. In the post-deregulation period, average fare and cargo rate levels worldwide declined by 6.5% per year, through 1988. Airport operating costs declined despite the increase in oil prices in the period between 1979 and the early 1980s. At the same time, more people were flying and load factors increased in this period. On a world-wide basis, the load factor on scheduled passenger flights is averaging in the upper 60% percent range, showing the possibility of limited improvement for increases in the load factor. Because of this strong demand, fewer
promotion and discount fares are expected in the coming decade, halting the trend toward lower fares.
REFERENCES


Air Transport World (June, 1986). "Ansett is trying to become Australia's Global Domestic Airline", page 18


Airline Business (August 1991). "Can Big be Beautiful?", page 34


Aviation Week and Space Technology (January 27, 1992). "USAir Expands Northeast Service in Effort to Regain Profitability", page 58


Aviation Week and Space Technology (October 21, 1991). "USAir Cost-Control Program Targets Salaries and Benefits to Reverse Losses", page 28


-72-

Aviation Week and Space Technology (November 26, 1990). "European Airline Pacts Grow, But Big Mergers Are Unlikely", page 77

Aviation Week and Space Technology (November 26, 1990). "Qantas Potential as Far East Airline Leader Awaits Outcome of Australian Deregulation", page 64


Aviation Week and Space Technology (September 3, 1990). "Europeans Lead Global Trend Toward Intercarrier Alliances", page 96


Aviation Week and Space Technology (October 29, 1990). "For First Time Since World War 2, Lufthansa to Offer Berlin Service", page 33

Aviation Week and Space Technology (September 17, 1990). "Government to Sell Some Interest in Qantas, May Sell All of Australian Airlines", page 129

Aviation Week and Space Technology (June 4, 1990). " Alitalia, USAir Sign Accord Aimed At Boosting Italy-U. S. Traffic", page 104

Aviation Week and Space Technology (May 28, 1990). "Iberia, Alitalia Sign Pact to Strengthen Market Penetration in Asia, Latin America", page 116

Aviation Week and Space Technology (May 21, 1990). "Air Canada Set to Rebuild To Compete in Global Market", page 36


Aviation Week and Space Technology (April 9, 1990). "Management, Unions Urged to Form New Relationship Based on Demands of Highly Competitive Global Market", page 68
Aviation Week and Space Technology (January 15, 1990). "Whence the Aircraft?", page 13


Aviation Week and Space Technology (December 11, 1989). "Soviets Attempt to Set Up Competitor for Aeroflot", page 42

Aviation Week and Space Technology (October 30, 1989). "Aeroflot Pursues Leases for Five A310s, Signs CRS and Hotel Pacts", page 55


Aviation Week and Space Technology (June 26, 1989). "Australia Eases Landing Rights Policy, Putting More Pressure on Qantas", page 97

Aviation Week and Space Technology (June 12, 1990). "Air Service Rights will be Key Issue for U.S. Carriers in Europe", page 157


Aviation Week and Space Technology (January 2, 1989). "Qantas, American, JAL Gain Shares in Air New Zealand", page 108

Aviation Week and Space Technology (October 10, 1988). "SAS, Texas Air Interairline Partnership", page 110

Aviation Week and Space Technology (August 22, 1988). "Pan Am/Aeroflot", page 105

Aviation Week and Space Technology (February 8, 1988). "European Consortia Three Suppliers Dominate the Field", page 63
Aviation Week and Space Technology (May 18, 1987). "Airlines Poised For Global Consolidation", page 45

Department of Transportation, Research and Special Programs Administration, Transportation systems Center, Center for Transportation Information. "Air Carrier Financial Statistics Quarterly", Cambridge, Massachusetts, US.


Fortune (January 1, 1990). "How Airlines will look in the 1990s", page 50


New York Times (January 2, 1991)."Why only a Few Big Airlines Prosper in a Deregulated Sky"


