ELECTRONIC COMMERCE IN TRAVEL AND TOURISM

INPUT

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Abstract

In this report, INPUT examines how electronic network systems that interconnect companies are used in the conduct of travel and tourism commerce. The report examines the kinds of systems users are implementing, what these systems allow users to accomplish, and how much users are spending on these systems. It identifies the developers and vendors of these systems and the economic influences impacting the implementation of systems. It discusses the influences these systems have on enterprise and industry organization, and future prospects for streamlining the selection and purchase of travel services and integrating travel planning information through electronic network applications that provide for "seamless travel."

This report contains 102 pages and 40 exhibits. An index of companies mentioned is included in the appendix.

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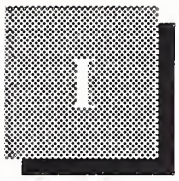
Exhibits



Introduction

A

Travel, Tourism, and Computerized Commerce

Travel and tourism, as we know it, is a phenomenon of the late 20th century. Passenger air transportation made swift and economical world-wide travel possible at about the same time that the computer began to revolutionize the business world.

Railroads gave an important boost to travel at the turn of the century and dominated travel for many years, and freeways have made vacationing by car an important part of tourism. But air transportation made global travel and tourism a reality, and the airline sector dominates electronic commerce in travel and tourism.

Frequent travel by air began only as recently as the 1970s:

- 1972 was the first year when the percentage of citizens who had ever flown on a plane exceeded 50% of the U.S. population.
- Only 20% of Americans took a flight in that year.

Simultaneously, computer-based software and systems provided the technology for the management and operations of airlines and other travel-related companies, as well as for interorganizational network applications.

Beginning in the mid-1970s, networks of computerized reservation systems (CRSs) began to be used to process commercial transactions between members of the travel and tourism trading community.

Other network applications that established themselves in the travel industry in the 1970s and 1980s include data bases on travel patterns and traveler purchases, EDI between air carriers and their suppliers, and EFT settlements between credit card companies and travel retailers.

B

Scope of this Report

This report examines the evolving role of CRSs and other electronic networks and systems in the travel and tourism industry. INPUT reviews trends and issues that are of concern to users of these systems and information technology firms, now and throughout the 1990s.

INPUT's primary focus is on U.S. travel and tourism industry players. Since these players' businesses are increasingly global in their reach, INPUT's view extends beyond U.S. borders to include the worldwide activities of U.S. firms, as well as selected international developments.

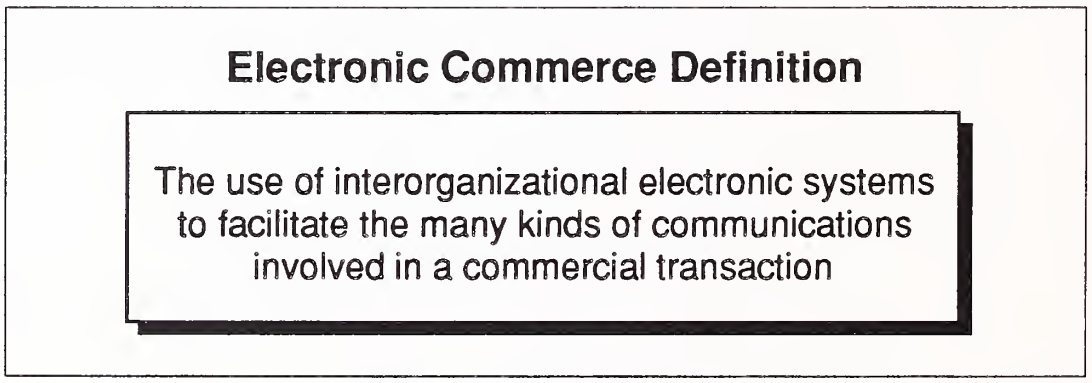
C

Electronic Commerce: Definitions and Impacts

Electronic commerce takes place by means of systems that interconnect organizations and facilitate transactions among organizations.

Exhibit I-1 states INPUT's definition of electronic commerce.

EXHIBIT I-1



Implicit in electronic commerce is the concept of a trading community. A trading community is more than a vertical market. It consists of all the organizations involved in delivering a consumer product or service to buyers. Electronic commerce systems link members of a trading community for more efficient delivery of products and services.

Exhibit I-2 states INPUT's definition of a trading community.

EXHIBIT I-2

Trading Community Definition

A company, its trading partners, and the trading partners of its trading partners. An expanded vertical market.

Groups of companies—trading communities—are joining together in building transcorporate, technically complex, electronic commerce infrastructures.

Joint sponsorship of community-wide systems is resulting in unusual business partnerships: systems shared by customers and suppliers, often jointly developed by users and information technology vendors, competitors working together to develop mutually beneficial systems, and providers of complementary products and services using electronic commerce to bundle their offerings to facilitate "one-stop shopping."

The impacts of electronic commerce on a trading community are far-reaching. By linking players as above, and streamlining or redirecting transaction flows to achieve efficiencies or economies of scale, electronic commerce forces a redefinition of organizational, systems, and applications boundaries, jobs, resources, and business practices within a trading community.

INPUT observes that when electronic commerce reaches a high degree of penetration within a trading community, it begins to impact transaction flows throughout that trading community. Internal systems may be required that operate within a single organization, but which serve as "back ends" to community-wide electronic commerce systems.

In examining electronic commerce-related impacts and opportunities, INPUT considers both classic electronic commerce systems as defined in Exhibit I-1 above, and back-end applications needed as a result of electronic commerce transaction flows:

- In the travel and tourism industry, examples of such back-end applications include airline revenue accounting and revenue management systems. These are not electronic commerce systems by definition because they do not facilitate electronic trading between partners.

- However, they are needed largely as a result of the high volume of transactions, the variability of competitive pricing, and the size of the vast network of electronic trading relationships within the air travel community.

- Travel agencies are also developing applications that interface with electronic commerce/reservation systems to provide service tailored to their customers' interests.

There are other impacts of electronic commerce upon organizational and systems boundaries, jobs, resources, and business practices, etc. within the travel and tourism community.

- Proprietary computer reservation systems, once viewed as strategic marketing tools by their owners, are in the process of moving from single-source or biased sales channels to unbiased electronic markets. As a result of this shift, airlines are confronted with the issue of how to manage the economics of developing, maintaining, and operating these systems, which have become costly tools for doing business.

- Other shifts in travel and tourism resulting from electronic commerce include the threat to intermediary members of being bypassed or eliminated, users becoming vendors, and new business opportunities arising—often related to the management or delivery of electronic commerce products or services.

These impacts and opportunities are examined in detail in Chapter VI of this report.

D
Report Methodology

INPUT drew on several sources for the data in this report.

- Interviews of more than 22 information systems users, developers, and managers who work with electronic commerce-related applications within the travel and tourism trading community

- Organizations represented in these interviews included travel-related services units of information technology firms, airline industry groups spearheading development of EDI or electronic commerce standards, travel industry consortia engaged in community-wide systems development, IS or reservation systems units of travel industry players (agencies, hotels, and airlines), and credit card processing firms involved in payment transactions for travel-related purchases.

- Results of ongoing INPUT EDI research

- Extensive trade press and independent research

- In-house data bases on companies and products
- Other INPUT studies

E
Related INPUT Reports

This report is part of a series of reports on specific trading communities and their use of network-based systems. The well-received series was established because INPUT recognized an important trend taking place in the economy: integration of trading communities, driven by the development of transcorporate, technically complex, electronic infrastructures.

The mission of these studies is to analyze the impacts of electronic commerce within trading communities: the overall commercial and economic phenomena taking place, trends in network-based interorganizational applications, and resulting impacts on and opportunities for users and vendors of information technology products and services.

Titles of related reports are:

Electronic Commerce: The New Foundation for Trade
Electronic Commerce in Health Care
Electronic Commerce in Trade and Transportation
Electronic Commerce in the U.S. Federal Government
Electronic Commerce in Grocery Production and Distribution
Electronic Commerce in Apparel and Retail
Electronic Commerce in the Media Industry
The U.S. Electronic Data Interchange Market, 1992-1997
The Electronic Data Interchange Market—Europe
The Electronic Data Interchange Market—Japan
Trends in Electronic Corporate Trade Payments

II

Executive Overview

A

Penetration of and Expenditures on Electronic Commerce in the Travel and Tourism Industry

Electronic commerce systems are more pervasive in travel and tourism than in other trading communities examined by INPUT. Exhibit II-1 lists four industries, the output of each and the revenues generated from electronic commerce systems in each.

EXHIBIT II-1

Travel and Tourism Electronic Commerce versus Other Industries

Trading Community	Ratio Expenditures vs. Output (Percent)	Electronic Commerce (Percent)
Travel and tourism	$3.6 billion/$312.6 billion*	1.1
Grocery	$1.8 billion/$540 billion**	0.3
Transportation	$260 million/$122 billion**	0.2
Health Care	$800 million/$676 billion**	0.1

* INPUT, U.S. Department of Commerce

** Other INPUT Electronic Commerce reports

The airline/travel industry derives more than one percent of its revenues from electronic commerce systems. This percentage is greater than in other industries, such as grocery, where electronic commerce systems play significant roles.

INPUT suggests that the airline industry in particular distributes its product through a marketplace more efficiently than do other industries and it is due to electronifying the marketplace.

INPUT further suggests that the extreme efficiency of the marketplace, coupled with deregulation, set the stage for today's rapid and disruptive consolidation of the airline industry.

The airline sector is a classic example of a market in which the "product" (air transportation) is highly standardized, and a majority of its transactions are carried out electronically.

Most U.S. airline tickets are now issued by travel agents using computer reservation systems (CRSs) originally developed by airlines. Since the introduction of the first reservation systems in agencies in the mid-1970s, the percentage of flights booked by agents has grown from 40 to the current 80-plus percent.

CRS and travel-related credit card processing revenues make up the majority of travel and tourism electronic commerce expenditures, as shown below in Exhibit II-2.

EXHIBIT II-2

User Expenditures on Key Electronic Commerce Software and Services

Software/Service	1992 Expenditures ($ Millions)
Computer Reservation Systems	1,500
Non-air network applications	6
EC-related systems development	250
EDI software	3
Shared airline systems	16
Credit card processing services (travel-related only)	1,835
Total	3,610

Although credit card payment transaction processing comprises a major part of total electronic commerce-related expenditures, INPUT sees developments in applications specific to travel-related commerce—airline reservation systems and related businesses—having the greatest impact on the travel and tourism community.

- CRSs, in the midst of shifting economics and organizational boundaries, are evolving to meet the demands of a new regulatory climate, redefine their role in the airline business, and upgrade aging technology.

- Developers of emerging systems (reservations and payment applications for non-air travel sectors) are moving to fit into the existing EC infrastructure, apply what they have learned from the lessons of their predecessors, and make use of electronic trading to define their markets to their own advantage.

- EC-related systems development (including new reservations and payment applications and back-end systems that interface with EC systems), EDI software, and shared airline systems are all businesses related to computer reservation systems. They process CRS transaction flows, enhance/extend CRS services, and/or build on the customer relationships of CRS owners.

B

Opportunities and Impacts of Electronic Commerce

There is a large gray area between users and vendors in the travel sector, as an increasing number of large user organizations form information services subsidiaries or band together in joint electronic trading ventures.

INPUT divides users in the travel and tourism industry into three broad groups that each face a different set of electronic commerce systems issues in the 1990s:

- Airlines, traditionally the information systems powerhouses of the industry, and owners and developers of the EC travel systems infrastructure

- Non-air travel services providers (hotels, car rental agencies, etc.) and developers of emerging EC applications

- Travel agencies, the "middlemen" who conduct their business using these evolving and emerging network applications

For the purposes of this report, INPUT also considers CRS developments user issues, since airlines own CRSs and use the systems to distribute their services.

Below, INPUT briefly lists the opportunities and impacts for each of the three groups of players. Detailed analysis of these opportunities and impacts can be found in Chapter VI.

1. User Impacts and Opportunities

a. Airlines

Exhibit II-3 lists the chief opportunities and impacts for airlines.

EXHIBIT II-3

Opportunities and Impacts for Airlines

- Re-architecting CRSs
- Redefining the CRS and resulting financial challenges
- New information services opportunities
- Improved customer service
- Enhanced accounting and revenue management
- Changes to industrywide financial agreements

Re-Architecting CRSs

Airlines face the challenge of updating their aging reservation systems to keep pace with current technology developments, while confronting the need to cut costs due to competitive and economic pressures. As the size and complexity of CRSs have grown, so have development and maintenance requirements and costs.

Redefining the CRS

A new definition of the role of the CRS is emerging. Once viewed as a marketing tool that offered its owners strategic benefits through screen displays and functionality favoring the owner's flights, today it has become more an information resource for agencies and travelers.

This transition from single-source or biased sales channels to unbiased electronic markets means that the systems have become necessary and costly tools for doing business.

New Information Services Opportunities

Airlines are exploring new information services ventures that make use of their accumulated technology expertise. Many of these initiatives are discussed throughout this report.

Customer Service Improvements

The current emphasis among airlines on customer service may provide technological and functional re-engineering for the next phase of electronic commerce in the industry. Airline and other travel industry players are now developing systems to support self-service ticketing, mobile customer service agents, automated boarding passes, and other service-oriented applications.

Enhanced Accounting and Revenue Management

The financial and economic pressures on the airline industry in recent years have resulted in a need to cut costs and maximize revenue. The sheer complexity of airline financial processes provides numerous areas for improvement through systems designed to provide specific financial management improvements.

Examples of two systems opportunities are: tightening up auditing and reporting through more powerful revenue accounting systems, and improving yield management and pricing capabilities by extending the scope of revenue management decisions.

Changes to Industrywide Financial Agreements

Many carriers believe that the airline industry interlining agreements need to be updated, because current settlement processes and rules on inter-carrier payments favor the owners of the dominant CRSs. Current rules, transaction flows, and specific points of contention are reviewed in detail in Chapters III and VI of this report.

Although specific rule changes are not known by INPUT to be "in the works," these and other such issues are being closely monitored by the carriers that are adversely impacted.

New rules would mean industrywide re-engineering of airline payment-related transaction flows, and would require changes to clearinghouse systems and carriers' internal revenue accounting or financial systems. And improved cash flow might also reduce the pace of consolidation by giving a boost to the smaller players.

b. Hotel, Car Rental and Other Non-Air Providers

Exhibit II-4 lists the opportunities for and impacts on non-air users of new developments.

EXHIBIT II-4

Opportunities and Impacts for Non-Air Travel Services Providers

- Expanding distribution channels
- Yield management systems
- Community-wide development
- Operating within the airline infrastructure

Expanding Distribution Channels

Developments in non-air reservation systems—hotel, rail, car rental, and others—are expanding these sectors' distribution channels to include travel agencies.

Sponsors of these developments include airline CRS owners seeking to expand their scope, as well as representatives of various travel sectors jointly building reservation systems and linkages to airline CRSs.

Travel sectors that stand to gain the most from electronic trading are those that offer highly standardized products, often packaged with airline travel.

Yield Management Systems

Paralleling community-wide reservation systems developments are improvements in internal reservations and inventory management systems.

Together, these new systems allow non-air players to employ more sophisticated pricing, manage yield better, and collect and analyze customer information for use in marketing planning.

Community-Wide Development

Distributed systems and development technologies have advanced in the twenty years since reservation systems first emerged, but the cost and complexity of systems development, and requirements to comply with an increasing amount of government regulation have risen as well.

The idea of going it alone on development projects of the size and scope of reservation and payment applications is outdated. The airline industry has demonstrated that competitors can work together in areas where they have common interests, and now non-air travel organizations are developing their own consortia.

Operating Within the Airline Infrastructure

Non-air sectors stand to benefit from improved access to travel agency bookings, but the presence of the electronic trade infrastructure established by airline CRSs means their efforts will be strongly influenced, if not driven in many cases, by airlines.

Airlines and travel agents are interested in the concept of "seamless travel"—perhaps implemented through the automated ticket and boarding pass (ATB)—used to record all trip details, from flight seats to hotel rooms, rental cars, and other service arrangements.

The challenge for hotels, car rental, rail, and tour operators is to work effectively within the airline infrastructure and take advantage of available resources, but at the same time guard their own business interests and develop standards, organizations, and business practices to support these interests.

c. Travel Agencies

Exhibit II-5 lists opportunities and impacts for travel agencies.

EXHIBIT II-5

Opportunities and Impacts for Travel Agencies

- Integrating travel information
- Emerging non-agency channels (self-service or direct-to-consumer systems)

Integrating Travel Information

Since the late 1970s, travel agencies have operated using CRSs developed by airlines as their primary IT resource. Now agencies are beginning to assume a stronger role in integrating multiple information sources to provide services tailored to their customers' interests.

A growing number of choices in travel systems software and a soft travel market are driving forces behind the trend for agencies to focus on getting more use of information systems in an effort to improve their services.

Emerging Non-Agency Channels

One of the end results of electronic trading can be the elimination of intermediaries. Agents and tour operators, as the primary intermediary groups in the travel value chain, should be aware of potential impacts from restructuring of transaction flows arising from electronic commerce.

To date, the travel sector has been somewhat unique in this regard, because the intermediaries or "middle men" in most cases have been the recipients of electronic commerce technology, rather than being bypassed by electronic commerce.

Nevertheless, the emergence of consumer channels that bypass travel arrangement services, or "pre-packaged" tour options that bypass tour wholesalers represent the sorts of threats to intermediaries that should be monitored.

2. Vendor Impacts and Opportunities

Many of the impacts on business practices described above are driving and reinforcing opportunities for providers of electronic commerce systems.

Exhibit II-6 lists some key opportunities for vendors whose core business is information services.

EXHIBIT II-6

EC Vendor Opportunities in Travel and Tourism

- Reservation systems (air and non-air)
  - Re-architecting systems
  - Integrating and globalizing systems
- Multiple CRS access and third-party software
- Outsourcing of community-wide systems operations
- Financial systems and customer service applications
- Greater EDI penetration

a. Reservation Systems

Re-architecting systems: The trend toward distributing and re-architecting CRS functions is creating opportunities for systems development services.

Integrating and globalizing systems: CRS mergers and the move to globalize the systems mean that significant work needs to be done to integrate previously independent regionally focused systems.

b. Multiple CRS Access and Third-Party Agency Software

Both the regulatory and the competitive environment are creating opportunities for systems and software products to work in conjunction with CRSs or add to the systems' capabilities.

Travel arrangement providers developing value-added reservation systems also present opportunities for consulting or development services.

c. Outsourcing of Community-Wide Systems Operations

As CRSs and other electronic trading systems have made the transition from proprietary, single-source systems to community-wide channels, outsourcing opportunities have begun to arise.

Financial issues and the need for CRS owners to focus on their core airline business certainly provide incentive for outsourcing, as evidenced by the EDS/System One agreement.

INPUT suggests that the nature of community-wide systems also makes outsourcing a compelling option. In jointly owned systems, the answer to who should be responsible for the ongoing care and feeding of the system is not necessarily "the owner." Which owner?

d. Financial Systems and Customer Service Applications

The importance of financial systems improvements and new customer service applications in the airline industry is generating opportunities for service vendors. Andersen Consulting's revenue accounting practice and Speedwing's mobile communications initiatives are two examples of vendors active in financial and customer service systems.

e. Greater EDI Penetration

EDI is used extensively in the airline sector of the travel community, although electronic commerce is primarily a product of real-time messages sent between network applications such as CRSs, not EDI transactions.

Interactive EDI standards now in development are aimed at developing real-time messages that support the reservations process for all travel sectors—air, rail, hotel, car, ferry—and are being designed to support international business requirements.

EDI suppliers can expect to continue developing new business with airlines, but should consider longer term opportunities in other travel businesses, especially as air and non-air systems continue to converge over the next three to five years.

C
Conclusions

Commerce among members of the travel and tourism trading community is highly automated, much more so than in any other community studied by INPUT to date. Classified as a vertical market, travel and tourism electronic commerce is a $3.6 billion market.

Electronic commerce is most extensive in the airline sector, but is moving into additional sectors, especially service areas that are highly standardized and services closely linked to air travel.

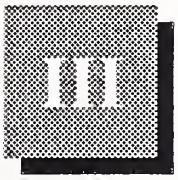
The maturing of electronic trade in the airline sector (which is approaching the end of its second decade of existence) presents some unique challenges. These challenges include:

- Making the transition from proprietary to open systems
- Updating and distributing centralized, 1970s-era mainframe applications
- Managing the costs of CRS development, operations, maintenance, and enhancements

The travel and tourism community as a whole can expect the following broad developments over the next decade:

- Consolidation among CRSs—more mergers, alliances, and an overall reduction in the number of major regionally focused worldwide players—from more than ten to no more than five globally oriented systems
- Non-air electronic commerce will establish its own identity, growing out of the various consortia and new initiatives detailed throughout this report. In time, the distinction between airline-oriented and non-air systems will fade or disappear altogether.

The travel and tourism market, which forced CRSs to move beyond their origins as single-source or biased airline sales channels to relatively unbiased electronic airline markets, is already demanding an expansion of these markets to support full-service travel shopping.



The Travel and Tourism Trading Community

Electronic commerce activity consists of commercial transactions among companies by means of interorganizational computer-based systems.

To provide an overall perspective on interorganizational transactions within the travel and tourism industry, INPUT first identifies the major players in the community and ways and degree to which they interact (as measured by trade volumes).

Such a "conversational mapping" of the community helps:

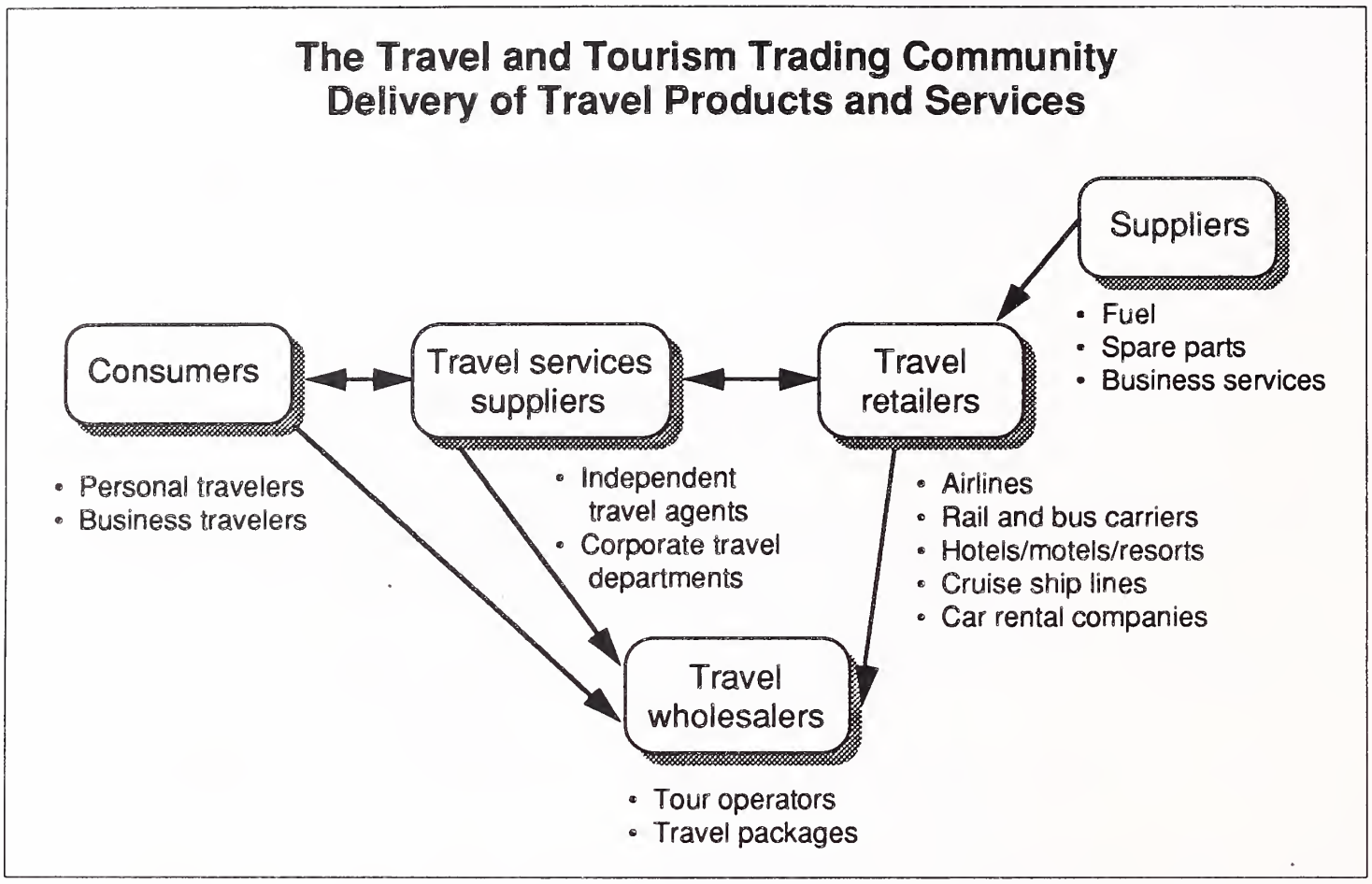
- Vendors of electronic commerce systems identify market segments and opportunities
- Travel industry companies to see where certain efficiencies can be gained through implementing electronic commerce and/or through re-engineering industry or enterprise workflows

A
Players and Trade Volumes

Exhibit III-1 depicts key travel and tourism players and their trading relationships. There are a few general categories of organizations:

- Transportation and lodging providers
- Travel services firms that make travel arrangements and serve as the distribution network for the larger travel retailers, particularly the air carriers
- Tour operators who specialize in various travel and entertainment offerings in packaged tours or vacations
- Suppliers who provide products and services to travel companies

EXHIBIT III-1



The market dependencies between the various travel service businesses are illustrated by the fact that travel arrangement services are needed to bundle together transportation, lodging, and other travel/entertainment options.

The ripple effect of recent air fare wars and the resulting boom in other travel services show these economic linkages as well.

The entire travel trading community is made up of a diverse group of travel-related businesses. Exhibit III-2 lists 22 travel industry players, including representatives of the financial sector that process travel payment transactions.

EXHIBIT III-2

Players in the Travel and Tourism Trading Community

1. Transportation and Lodging Services
   a. Airlines
   b. Airports
   c. Intercity bus companies
   d. Passenger rail service
   e. Hotels and motels
   f. Resorts
   g. Campgrounds and trailer parks
   h. Casinos
   i. Conference and convention centers
   j. Cruise lines; passenger ship and boat operators
   k. Car rental companies

2. Travel Arrangement Services
   a. Travel agencies
   b. Tour operators
   c. Corporate travel departments

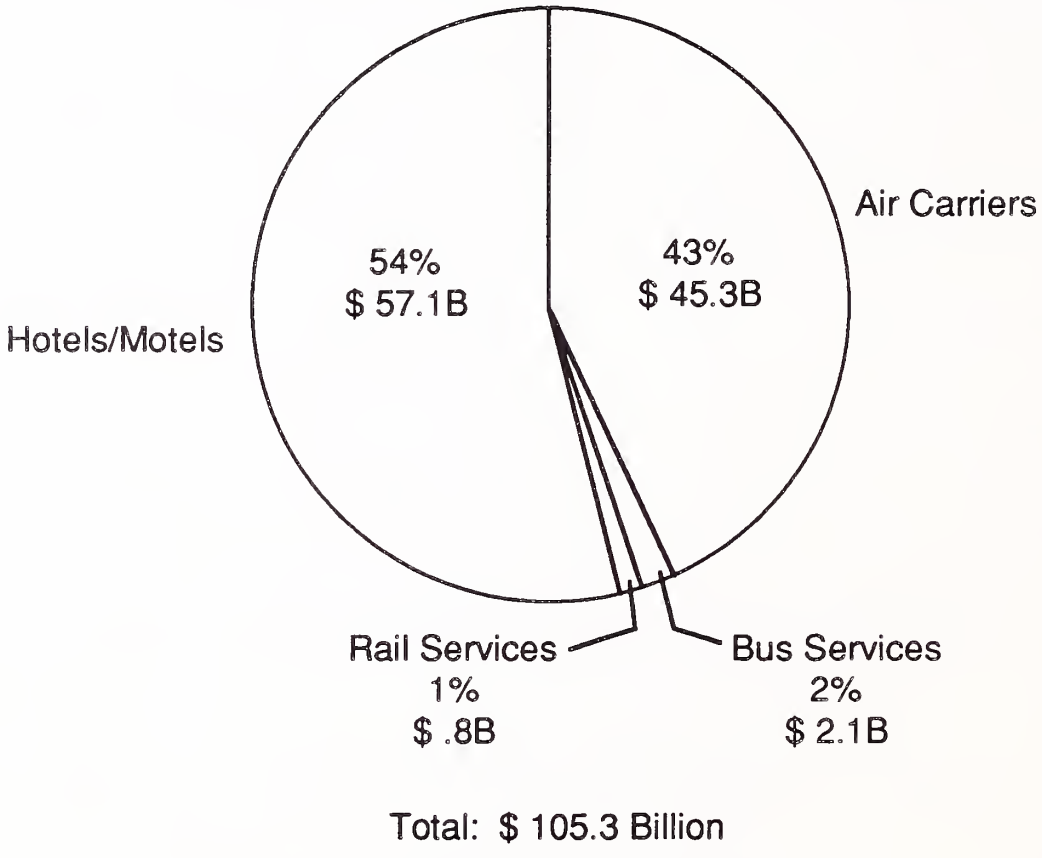
3. Suppliers to Transportation and Lodging Companies
   a. Fuel companies (for air and ground vehicles)
   b. Maintenance and parts suppliers
   c. Caterers
   d. Electric, gas, and water utilities
   e. Communications services suppliers

4. Financial Services
   a. Credit card companies
   b. Credit authorization services
   c. Industry-specific clearinghouses (e.g., Airline Reporting Corporation)

1. Airlines

The U.S. Travel Data Center estimated that air passenger services accounted for 43% of total U.S. transportation and lodging receipts in 1989 (see Exhibit III-3). The transportation and lodging sector is dominated by the air carriers and the hotel/motel industry, with other modes of transportation totaling less than 5% of revenues.

EXHIBIT III-3



a. Industry Consolidation

The six largest air carriers—United, American, Northwest, Continental, and Delta—flew 80% of the passenger traffic in 1991, according to Standard and Poors—a significant increase from the 62% share of traffic for the top six in 1985. The industry has continued on a consolidation path, with four major airlines (America West, Continental, Midway, and Pan Am) entering bankruptcy proceedings in late 1990. Braniff was the latest casualty, following 1992 price wars.

b. Expansion of International Routes

U.S. airlines are expanding their international operations. The three biggest domestic airlines—United, American, and Delta—have recently purchased international routes from reorganizing or bankrupt carriers such as Eastern, Pan Am, and TWA.

The FAA is forecasting international traffic growth at 6.4% annually in its twelve-year outlook for 1991 to 2003. Its U.S. forecast shows average annual domestic traffic growth of 4.1%.

Liberalization of the airline industry in Europe, and a 1991 decision by the U.S. Department of Transportation allowing non-U.S. airlines to own up to 49% of the shares of a U.S. airline are contributing to the globalization of air transportation.

c. Reservations and Payment Transactions

Exhibit III-4 shows the flow of transactions resulting when a traveler reserves and purchases an airline ticket. Two principal payors to airlines are consumers and the airlines themselves.

Consumer payments are largely electronic via bank credit EFT, and go to the carrier who cuts the ticket (or lift, in airline terminology). Intercarrier payments—usually EFT interbank transactions—are required to provide an economic settlement between carriers, since the carrier who cuts the ticket may not fly any or all segments of the itinerary, due to interlining.

Interlining is when a traveler flies on more than one carrier in an itinerary. There may be changes in the carrier after a ticket is cut, (e.g., when a flight is canceled and the traveler is moved to another airline's flight).

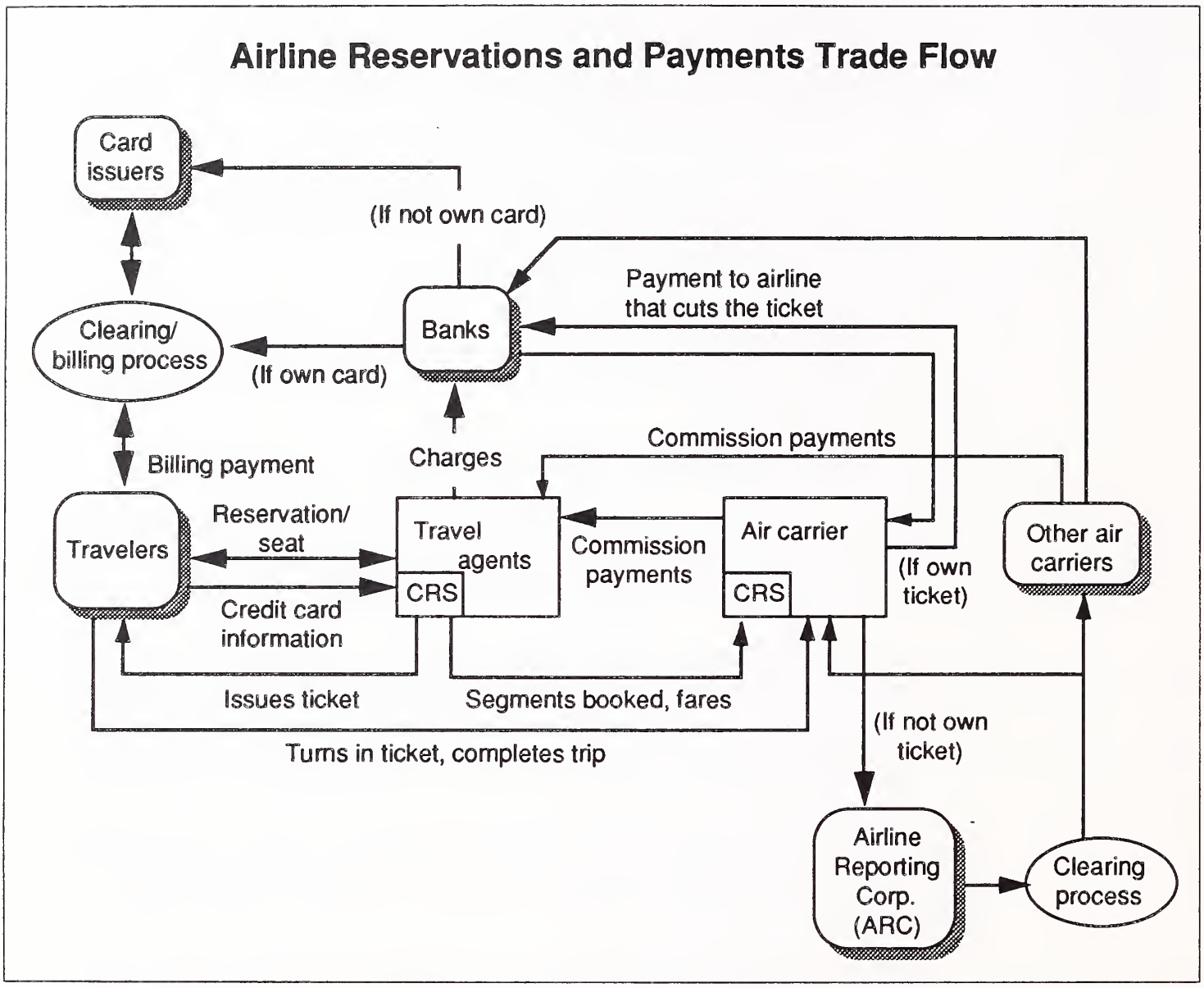
Airlines make three other main types of payments related to the sale of passenger seats:

- Commission payments to travel agents, the intermediaries who book over 80% of airline tickets. Agents receive a percentage commission (generally 8-10% of the fare) on every flight segment they book for a carrier.

- Taxes and tariffs as applicable (not shown on the diagram for the sake of readability)

- Booking fees, paid by carriers to the owners of the computer reservation system for each of their seats/flight segments booked on a given system (again, omitted from Exhibit III-4 for simplicity's sake).

EXHIBIT III-4



The complexity of this community-wide financial settlement process has resulted in the need for "back-end" revenue accounting systems used by individual carriers to audit revenues and commission payments for accuracy.

Also, many carriers (especially those other than the owners of the largest computer reservation systems) say that the airline industry's payment processes need re-engineering, because settlement rules on intercarrier payments favor the largest carriers and CRS vendors.

Impacts and opportunities stemming from these airline financial transaction issues are discussed in more detail in Chapter VI of this report.

d. Intercarrier Transactions: CRS Fees

As noted above, carriers also pay a fee per flight segment booked to the computer reservation system (CRS) that cuts the ticket. INPUT estimates that the total of such fees collected in 1992 will amount to $1.3 billion, on approximately $60 billion in ticket sales.

Airlines that own reservation systems have an advantage over carriers that do not have systems, in terms of savings in booking fees, which would otherwise add to the cost of ticket sales.

Chapter VI of this report further examines the shifting economics of CRSs.

e. Airline Business Trends

All the air carriers have been impacted severely by the current economic conditions, which came on the heels of the Persian Gulf War and the resulting reduction in air traffic due to safety concerns.

All but one of the 10 major U.S. carriers operated at a loss in the first half of 1991 (see Exhibit III-5 for each company's operating results), and as of this writing in mid-1992, price competition among carriers continues to force fares lower.

Opportunities to improve profitability through incremental savings or revenue enhancement are seen as being of premium importance. Improvements in customer service are also seen as key to achieving competitive advantage.

2. Hotels and Motels

There were 44,300 U.S. lodging properties as of 1989, according to the American Hotel Management Association, with a total of approximately 3 million rooms available for rent. Of these, 17 major hotel chains account for 85% of the electronically booked hotel rooms rented in the U.S.

The hotel and motel industry, while slightly larger in revenues than the airline industry ($57.1 billion versus the airlines' $45.3 billion in 1990), has not experienced the consolidation and commoditization of the airline industry.

EXHIBIT III-5

The 10 Major U.S. Scheduled Passenger Carriers Operating Results for the First Six Months of 1991

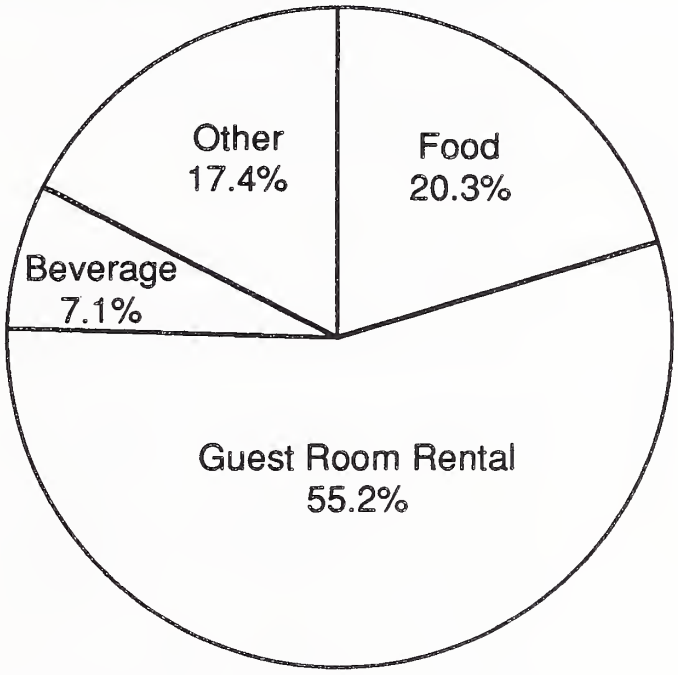
Carrier	$ Millions				Operating Profit Margin (Percent)
	Revenues	Operating Expenses	Operating Expenses	Net Income	
America West	731.4	778.1	-46.7	-80.8	-6.40
American	5,583.3	5,733.5	-150.2	-172.4	-2.70
Continental	2,592.6	2,827.8	-235.3	-313.8	-9.10
Delta	4,823.5	4,887.9	-64.4	-64.9	-1.30
Northwest	3,490.0	3,560.0	-75.0	-29.0	-2.20
Pan AM	1,411.0	1,752.0	-340.8	-149.2	-24.20
Southwest	607.5	579.5	9,957.0	2,353.0	1.60
TWA	1,747.0	1,944.4	-197.4	-248.8	-11.30
United	5,516.9	5,722.1	-205.3	-104.3	-3.70
USAir	3,246.5	3,435.8	-189.3	-225.5	-5.80
Total	29,749.7	31,239.2	-1,494.3	-888.8	-5.02

Source: S+P Industry Surveys, 1991

However, many of the large chains such as Quality Inns International, Marriott, Hilton, and Promus have segmented their services into various classes, often under different brand names, offering service targeted at the specific needs and budgets of different groups of travelers. This segmentation and standardization of services is positioning large chains to achieve the benefits of electronic commerce. The hotel business derives nearly 45% of its revenues from services other than guest room rental (see Exhibit III-6). On the supply side, hotels' largest purchases are primarily services and real estate, with wholesale or retail products (primarily food and supplies) comprising less than 10% of the top six categories of outlays in 1985, according to the Department of Commerce (see Exhibit III-7).

EXHIBIT III-6

Sources of Lodging Industry Dollars



Source: Laverthol and Horwath, 1989

EXHIBIT III-7

Hotel Industry Purchases, 1985
Top Six Spending Categories

	Amount ($ Billions)	Percent of Total
Business services	5.9	30
Utilities	4.6	24
Real estate	4.2	22
Finance/insurance	2.0	10
Wholesale/retail	1.5	8
Communications	1.2	6
Total	19.4	100

Source: U.S. Department of Commerce, 1985

3. Rail and Bus Carriers

Though rail and bus travel today comprises only a small piece of the U.S. travel business, rail travel in particular is far more significant for both personal and business travelers in Europe and Asia. High-speed rail lines between major European and Asian cities, and stations located in the center of metropolitan areas make train trips preferable to short air flights in many cases.

Most rail and bus trips are reserved and purchased directly from the carrier or sold in blocks to tour operators, rather than through travel agents, but recent movements in the development of European rail reservation systems are aimed at opening the agency channel to the rail sector.

4. Travel Agents and Travel Arrangement Services

Thirty-five thousand U.S. travel agents make up the population of entrepreneurs linked together by computer reservation systems (CRSs) and serve as the distribution channel for the travel industry, primarily airlines.

Ninety-three percent of all U.S travel agents have at least one CRS terminal. U.S. business receipts from travel arrangement services, including travel agents and tour operators, totaled approximately $8.65 billion in 1989, according to the U.S. Census Bureau.

Agents issue approximately 80-85% of all U.S. airline tickets through airline reservation systems, with the remaining 15-20% cut directly by the carrier. Agency commissions on airline tickets booked through CRSs average 8-10% of ticket prices.

Travel agents and tour operators make most of their earnings (77%) arranging air travel or packaged tours. Only 6% of their revenue comes from hotel/motel arrangements, and 2% from car rentals (see Exhibit III-8). This, and the fact that U.S. hotel revenues exceed airline revenues, points to an opportunity in the hotel and car reservations arena. Emerging network applications and CRS extensions aimed at these sectors support this indication.

EXHIBIT III-8

Passenger Transportation Arrangement Receipts by Type of Travel Service, 1989

	Amount ($ Millions)	Percent of Total
Air carriers	4,968	57
Package tours	1,758	20
Hotels and motels	514	6
Water carriers	362	4
Motor coaches	311	4
Rental cars	154	2
Railroads	54	1
Other	533	6
Total	8,654	100

Source: U.S. Census Bureau

Agents pay CRS vendors a flat monthly fee or per-transaction usage charges. CRS service charges comprise the bulk of most travel agency spending on automation. Only very large agencies have developed in-house MIS operations to a significant degree.

Of the eight Super Regionals (listed in Exhibit III-9), an affiliation of large corporate travel agencies, six agencies surveyed recently by *Travel Weekly* magazine said they spent around $100,000 on MIS upgrades in 1991.

Case studies of two other large agencies (Rosenbluth Travel, a major corporate agency; and the California State Automobile Association, a regional AAA organization) are presented in Chapter VI.

EXHIBIT III-9

The Super Regional Corporate Travel Agencies

- Associated Travel - Santa Ana (CA)
- McCord Travel - Chicago (IL)
- Murdock Travel - Salt Lake City (UT)
- Mutual Travel - Seattle (WA)
- Professional Travel - Denver (CO)
- Travel Inc. - Atlanta (GA)
- Travel One - Mt. Laurel (NJ)
- Travel & Transport - Omaha (NE)

5. Packaged Tour Operators

Acting as wholesalers in the travel supply chain, tour operators buy up blocks of inventory (airplane seats or hotel rooms), and market travel packages combining transportation, lodging, and entertainment provided by a number of travel retailers.

They combine direct transactions with carriers for these advance purchases and reservations through computer reservation systems and travel agencies when a specific tour is being booked.

6. Financial Clearinghouses

The Airline Reporting Corporation (ARC) is an organization owned by the U.S. airlines, and serves as a financial clearinghouse for distributing agency commissions and each carrier's share of ticket revenues.

International clearinghouses known as Area Settlement Plans or Bank Settlement Plans (ASPs or BSPs) serve carriers in the European and Asia/Pacific regions.

The U.S. hotel industry now has a similar organization, called the Hotel Clearing Corporation (HCC). It began operations in April 1992 and serves the 17 large hotel chains that account for 85% of the electronically booked hotel rooms rented in the U.S.

HCC is phase one of the THISCo (The Hotel Industry Switch Company) initiative, described in more detail in Chapter IV of this report.

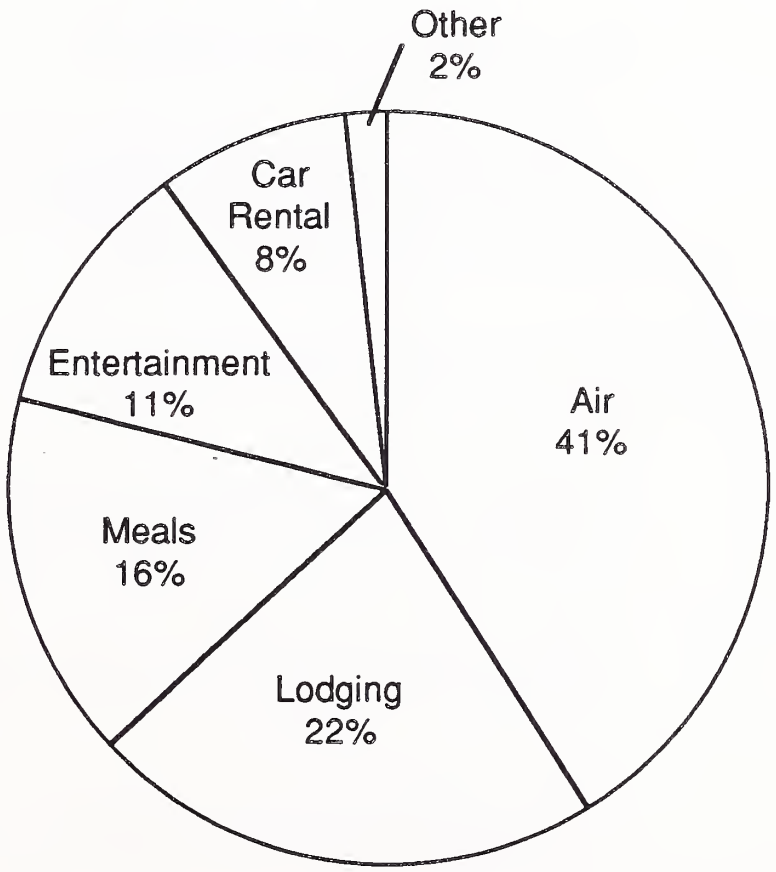
7. Credit Card Services

Credit cards are the primary method of payment for major travel purchases. Because of their widespread use in the travel industry and because credit card transactions require electronic networks, INPUT considers credit cards important components of electronic commerce in travel.

American Express, which has 80% of the business travel and entertainment (T&E) credit card volume, says that T&E expenditures in corporate America were roughly $115 billion in 1991. Exhibit III-10 shows the percentage breakdown of T&E expenditures by category.

EXHIBIT III-10

U.S. Business Travel and Entertainment Expenditures, 1991-1992



Source: American Express, San Francisco Chronicle - 1992

Bank cards comprise the remaining 20% of U.S. T&E credit card volume, and a large share of the personal travel-related credit card purchases.

Exhibit III-11 shows some key measures of the U.S. bank card business. In terms of just transaction volumes, travel-related transactions constitute approximately 8% of total bank card usage.

EXHIBIT III-11

U.S. Bank Card Business Volume, 1991
Mastercard and VISA

Item	Amount	Percent Change 1990-1991
Cards in circulation	232.1 M*	4.5
Total accounts	166.5 M	5.3
Transactions processed	3.56 B**	6.3
Gross volume	269.41 B	7.4

* Worldwide cards = 454.0M (U.S. cards = 51%)
** Worldwide transactions = 7.82B (U.S. transactions = 45%)

Source: The Nilson Report, 1992

Many parties are involved in the bank card business. A bank markets the card, another party sends the plastic to the customer, another does the billing, another deals with the merchant, a fifth handles authorization, and a sixth party deals with collections.

B

Issues in the Travel and Tourism Business

The level of standardization (i.e., how close to being a commodity the product or service has become) is a key determinant of an industry sector's readiness to implement and benefit from electronic commerce.

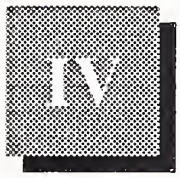
Airline travel has reached commodity status in many respects. For most commonly traveled routes, a number of carriers can get travelers to their destinations with similar levels of service for about the same price.

Carriers' mileage clubs encourage customer loyalty, but the industry has been driven by competitive pressures to consolidate. And the industry has achieved the benefits of electronic trading via a wide-reaching, shared distribution network of reservation systems on the customer side, and supplies and engineering information on the operations side.

The lodging industry is now following a similar path to that of the airlines, except in the case of resorts, inns, theme parks, etc. where the lodging itself is a vacation or getaway destination.

Travel agents have benefited from electronic trading, largely through technology provided to them by their major suppliers, the airlines. New developments in the agency sector are aimed at improving the agents' level of service to their customers.

The following chapter examines specific electronic commerce applications in each of these major travel sectors, both existing and maturing systems, and new initiatives in development.



Existing and Emerging Electronic Commerce Systems

Travel and tourism electronic commerce systems support the linkages between travel providers, customers, and other trading partners needed in a globalizing and increasingly competitive business environment.

INPUT's 1992 revenue forecast for existing travel and tourism electronic commerce systems is shown in Exhibit IV-1.

In this chapter, INPUT examines developments in new and maturing electronic commerce applications in terms of their usage in the industry, enabling technology, costs, benefits, and revenue generation.

Most travel industry electronic commerce applications are distributed information systems that fall within a few broad functional categories (see Exhibit IV-2).

Many of the larger, more recent developments are community-wide information systems developed jointly by industry consortia to meet the needs of multiple trading partners.

A
Computerized Reservation Systems (CRSs)

1. Airline Reservation Systems

Airline reservation systems were originally developed in the 1960s for carriers to keep track of seats sold on their flights. In the mid-1970s, carriers began to discuss the possibility of jointly expanding from internal operations to other distribution channels. Instead of a jointly owned airline reservation system, American Airlines' SABRE shortly thereafter became the first of the airline reservation systems to be installed in travel agencies.

EXHIBIT IV-1

Electronic Commerce in Travel and Tourism
1992 U.S. Revenue Forecast*

	Processing Services ($M)	Hardware/ Software ($M)	Prof. Svcs. Sys. Integ. ($M)	Total ($M)
CRSs	1,325	175		1,500
SABRE	(a)	(b)		
Apollo				
Worldspan				
System One				
Hotel Network Applications	6			6
Electronic Commerce			250	250
Systems Development (c)				
EDI Software		3		3
Shared Airline Systems (d)	16			16
Credit Card Services (e)	1,835			1,835
Totals	3,182	178	250	3,610

* U.S. market means revenues taken by U.S. companies, despite the fact that systems support international transactions

Notes:

(a) Airline booking fees
(b) Travel agency leases - hardware, software licenses, and usage fees were charged.
(c) Includes development of joint reservations systems,financial clearinghouses, and other shared or interorganizational system.
(d) Reservations, airport operations, seat inventory, and other applications running on host computers and offered as processing services.
(e) Uses processing charge factor of 1.2% per dollar volume on $153 billion in travel expenditures on credit cards.

EXHIBIT IV-2

Travel and Tourism Electronic Commerce Major Application Areas

- Computerized reservations (airline, hotel, car rental, rail)
- Travel agency applications
- Clearinghouses
- Customer service
- Operations and maintenance
- Air cargo information
- Traveler information
- Credit card services

U.S. airline deregulation in the late 1970s drove the need for travel agency automation to keep track of fares, rules, restrictions, and schedules. By the early 1980s, five U.S. airlines (American, United, TWA, Eastern, and Delta) had developed travel agency extensions of their internal reservation systems and had begun to place the systems in travel agencies.

These systems today are the top four airline CRSs in U.S. installations, and are listed by name and owner airlines in Exhibit IV-3.

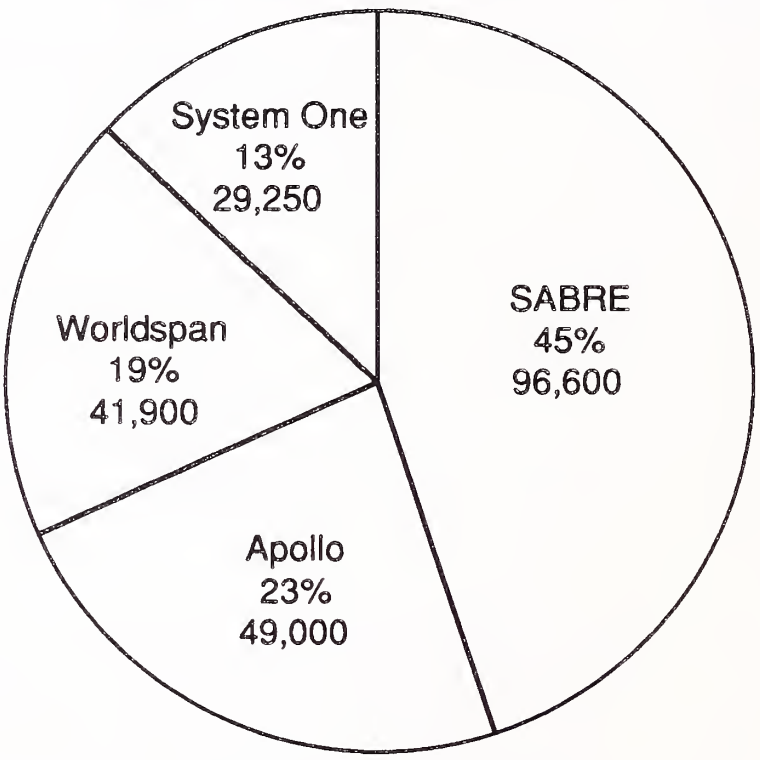
EXHIBIT IV-3

Leading Airline Reservation Systems in U.S. Installations

System	Carrier-Owner(s)
SABRE	American
Apollo	United, USAir, British Airways, KLM, Swissair, Alitalia, Air Canada
Worldspan	TWA, Northwest, Delta
System One	Continental

Currently, over 200,000 airline CRS terminals are installed in U.S. travel agencies, with worldwide total installations in excess of 327,000 terminals (see Exhibits IV-4 and IV-5).

EXHIBIT IV-4



Source: *Information Industry Bulletin*, 1992

EXHIBIT IV-5

Worldwide Computer Reservation Systems—Agency Terminals, 1991-1992

System	Terminals	Locations
Abacus	4,000	1,500
Amadeus	28,100	11,760
Apollo	85,000	15,000
Axxes	7,200	N/A
Fantasia	2,000	1,000
Galileo	21,000	6,760
Gemini	10,500	3,500
Infini	1,000	N/A
SABRE	97,000	19,000
Southern Cross	700 (est.)	N/A
System One	29,000	7,700
Worldspan	42,000	10,000
Total	327,500	76,220

Besides being an effective channel of distribution for passenger air carriers, computer reservation systems have provided their owners with significant revenues, the lion's share of which come from booking fees paid by airlines whose seats are sold through the CRSs.

INPUT estimates that total CRS revenues for 1992 will be approximately $1.5 billion. Exhibit IV-6 shows estimated revenues of the top four U.S. airline reservation systems.

CRS revenue components are as follows:

- Carriers whose flights are booked on a CRS pay the vendor a booking fee of approximately $3 per segment booked.
- Travel agencies pay a monthly fee or per-transaction charges for use of CRS software and hardware.

EXHIBIT IV-6

U.S. Airline Reservation Systems Estimated Revenues, 1992

System	Revenue ($M)	Percent of Total
SABRE	525	35
Apollo	345	23
Worldspan	360	24
System One	270	18
Total	1,500	100

Source: *Business Week*, INPUT

In addition, a number of CRS vendors market the airline and airport operations components of their systems to other airlines, which pay a processing fee based on usage level (measured by number of passengers boarded). Vendors refer to these as "shared" or "multihost" systems.

SABRE and System One are two of the large U.S. CRSs whose owners earn processing services revenue from these systems.

- American's information services unit, AMRIS, offers SABRE as well as a second product, SAAS, for small to medium-sized carriers.
- System One's product is SHARES (Shared Airline Reservation System).
- The SITA network offers a system known as Gabriel, an airline operations product without the travel agency distribution component.

Recent developments in the airline CRS arena include:

a. Extension of CRS Capabilities

- Vendors have expanded CRS information and services to include features as diverse as hotel, rental car, tour wholesaler, cruise ship information, theater and event tickets, and gift and greeting services.
- For example, some CRSs now have modules that use CD ROM and imaging technology to let travelers and travel agents view images of selected hotel properties to filter information about the hotels.

b. Regulatory Movements to Eliminate CRS Vendor Bias

The U.S. Department of Transportation (DOT) is currently studying proposed regulations that would affect the length of agency contracts with CRS vendors and freedom of agencies to use third-party software or equipment to access multiple vendors' systems, and would require CRS vendors to provide the same display and ease-of-use features in their systems for all carrier information and ticketing.

DOT has been considering CRS rule changes since 1990, and as of May 1992, had requested an extension to December 1992.

Most CRSs use subtle features such as favored display position, or simpler booking and ticketing transactions (requiring less time and/or fewer keystrokes) to encourage bookings of its owners' flights, but are reducing such bias in response to regulatory pressure and agency demands.

Worldspan, the third largest CRS vendor in installed market share, says that it is developing a new system that will include neutral display and ticketing features. This announcement came in 1991 after antitrust charges against Worldspan were threatened in 27 states.

American Airlines had earlier contended that eliminating the owners' competitive edge from their systems penalizes successful CRS vendors.

c. Consolidation and Global Expansion

Like their airline owners, CRSs are consolidating and expanding overseas.

To date, consolidation has taken the form of mergers and partnerships aimed at achieving broader based ownership of CRSs to support the increasing costs of development and maintenance. International partnership activity has been prominent as well.

With approximately thirteen independent airline reservation systems worldwide, a consolidation of systems and vendors to two or three major carriers seems imminent, and most vendors see globalizing as key to surviving consolidation.

The U.S. travel agency sector is close to saturation (93% of U.S. agencies have airline CRSs), but Europe and other global agency markets are far less automated.

A summary of recent movement in CRS mergers, agreements, and internationalization follows.

Covia/Galileo

United Airline's Apollo system, jointly owned by Covia Partners (United, USAir, and five European carriers), merged this year with the European Galileo system, to create Galileo International, owned 50% each by U.S. carriers and a group of European carriers led by British Airways. Covia also has a marketing agreement with Gemini, a Canadian system.

System One/EDS

In April 1991, Continental Holding's System One signed a ten-year outsourcing agreement with EDS, valued at $2.1 billion, to turn over its information technology services for System One and Continental Airlines. A planned purchase by EDS of 50% of System One fell through, but EDS has assumed operations of the organizations and has taken on System One's employees.

Worldspan

Worldspan was created in 1990 as a result of the merger of the TWA and Northwest system (PARS), and Delta's system (DATAS II). Worldspan shares its technology and data center with Abacus, a Far East CRS owned by nine airlines led by Cathay Pacific and Singapore Airlines.

AMADEUS

A European-owned CRS jointly initiated by Air France, Lufthansa, and SAS in 1987, AMADEUS began operations in 1992. Merger talks between AMADEUS and SABRE broke off in late 1991, and both vendors are currently approaching international expansion on their own.

2. Hotel Reservation Systems

Only 22% of hotel bookings are generated by travel agents (compared to over 80% of airline bookings); this difference is in part due to the inability of current systems to provide up-to-date information.

Independent hotel-oriented CRS developments began to emerge in the late 1980s in an effort to improve the effectiveness of the networks currently in place.

Room availability information on airline CRSs is not completely current because the systems are updated in batch, and to cover the time lag between batch updates hotels provide only a subset of available rooms to these systems.

Therefore it is not uncommon for a traveler to call a travel agent, who checks the CRS and replies that no rooms are available at a given hotel, then call the hotel and be able to choose between several rooms at different prices and levels of service.

Recent joint initiatives include:

- C/LAS International, a hotel reservations and marketing service developed by Loews Hotels and Covia Partnership
- CONFIRM RS, a hotel and car rental reservation system being developed by the INTRICO—the International Reservations and Information Consortium. Initial roll-out of CONFIRM RS is planned for late 1993.
- UltraSwitch, developed by THISCo (The Hotel Industry Switch Co.), an initiative of 15 hotel chains developing a generic switch to allow airline CRSs real-time access to hotel reservation systems information.

a. INTRICO's CONFIRM RS

[Note: As this report went to press, the INTRICO CONFIRM project was cancelled.]

INTRICO was formed in 1988 on the premise that no organization alone could practically meet the technical and financial requirements for developing "a definitive" hospitality CRS.

The partnership includes three user partners: Budget Rent a Car, Hilton Hotels, and Marriott Corp. The fourth partner, AMR Information Services (AMRIS), is developing the technical design and building the CONFIRM system.

The partners' systems development investment in CONFIRM is $125 million.

The INTRICO consortium is affiliated with TeleService Resources, Inc., another division of AMRIS, which through its voice communications product, TeleCONFIRM, is the largest provider of third-party telephone reservation services for car rental and hotel companies worldwide.

Voice services clients of TeleService Resources will migrate to CONFIRM for reservation information processing, and both INTRICO and TeleService are actively marketing CONFIRM.

Two IBM 3090 mainframe platforms are employed by CONFIRM RS, one using TPF for the central reservation system, the other running an MVS-based DB2 data base used to support management reporting and customer history archiving. Texas Instruments' Information Engineering

Facility (IEF) CASE product is being used as the code generator for large portions of the system code. INTRICO plans for CONFIRM to be accessed by travel agents through airline CRSs, either via UltraSwitch or a direct real-time link.

b. THISCo's UltraSwitch

UltraSwitch was conceived in 1988 with the aim of solving the problems of batch interfaces between airline CRSs and individual hotel chains.

Within the major hotel chains, costs of developing real-time interfaces was estimated at $50,000 to $100,000 per interface. The UltraSwitch initiative was funded by fifteen major hotel chains to achieve economies of scale. Partners include:

Best Western International, Choice Hotels, Forte Hotels, Hilton, Holiday Inns, Hospitality Franchise Systems, Hyatt Hotels, Inter-Continental, ITT Sheraton, LaQuinta Motor Inns, Marriott, Promus, Westin Hotels and Resorts, and Reed Travel Group (owner of the travel agency trade publication, *Travel Weekly*).

Anasazi, a Phoenix-based firm, is developing the UltraSwitch system and will be responsible for ongoing operations of the system after completion of Phase II.

Phase I of the system is now in operation, with 1992 volume expected to be 5 million - 6 million bookings, and total booking revenues (paid by member chains) of approximately $1.4 million.

Phase I consisted of development of the hotel-to-CRS linkages. The first hotels went on-line in late 1989; all 15 founding chains are now on-line. Exhibit IV-7 shows Phase I network transaction flows.

Phase II, planned for completion at the end of 1992, consists of a hotel data base that can be searched to identify hotels that meet selected criteria, i.e., close to Chicago O'Hare airport; rates in the $75-$100 range.

Phase II will also support access to specific hotels' systems for more detailed information such as services available and room availability.

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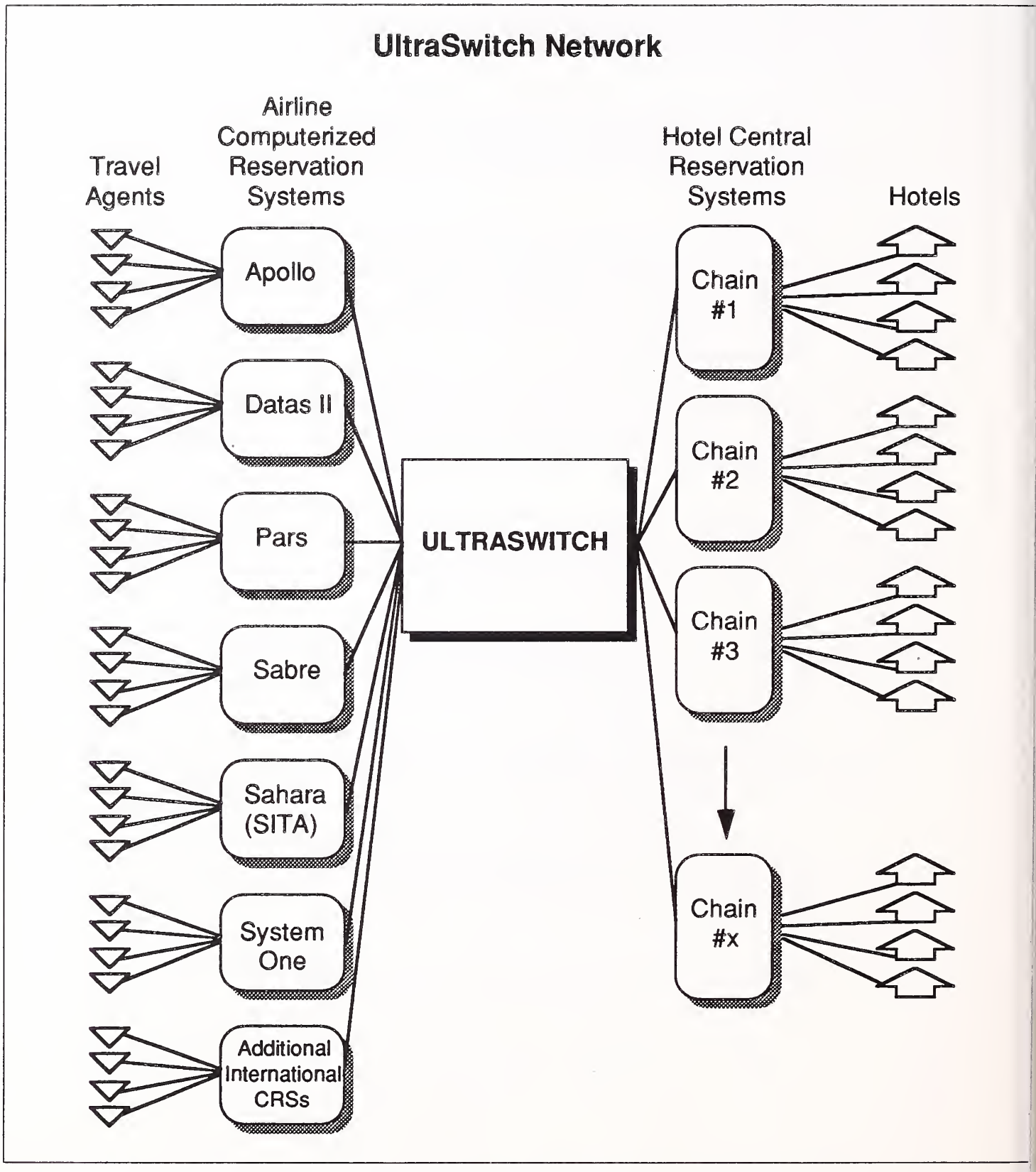
EXHIBIT IV-7



c. Hotel Chain-Specific Reservation Systems

Individual chain-specific reservations and property management systems developments are continuing in tandem with industrywide lodging reservation initiatives.

Holiday Inns, Promus, and ITT Sheraton are examples of hotel corporations that have recently announced development of new reservation and property management systems linking from 400 to 1,600 properties over the U.S or worldwide.

3. Car Rental Reservation Systems

Car rental companies (with fewer major players than large hotel chains) have already developed their own real-time links to major air reservation systems.

The AVIS reservation system unit, WizCom, has a number of hotel clients for which it has developed links to airline CRSs via the AVIS network. The hotels pay AVIS a fee per reservation processed, as well as monthly communications charges.

EDS, under an outsourcing agreement with National Car Rental signed in 1991, plans to market services based on National's software to other vehicle rental companies.

4. Rail Reservation System—RESARAIL 2000

RESARAIL 2000 is a new rail-based reservation system jointly sponsored by the Société Nationale de Chemins de Fer Français (SCNCF, the French National Railroad) and Transportation Automation Services, a division of AMRIS.

The system is based on SABRE's functionality, adapted to the needs of passenger rail carriers, with the aim of moving rail companies into a position in which they can take advantage of travel agencies as distribution channels.

AMRIS is marketing the system to other passenger rail carriers, either as a software product or as a multihost processing service.

5. Interactive EDI Reservations Standards

While airline reservations systems have made a big impact on the travel industry, EDI standards covering the broad spectrum of reservation functions for the entire travel and tourism industry are needed.

To fully automate the industry, messages must flow between travel agencies, airlines, hotels, car rental companies, rail transportation providers, and other travel-related businesses.

Since September of 1990, a joint X12/EDIFACT Travel Tourism and Leisure industry committee has been working on definition of functional requirements for interactive EDI standards to support reservation transactions for a wide variety of travel-related organizations.

The group is international in composition, having been initially formed to bring together airline-specific interactive EDI (I-EDI) development sponsored by the Air Transport Association in Washington, D.C., and the work of MD8, a European car/ferry/rail travel standards organization. Since initiation of the project, members have joined from Asia/Pacific travel organizations as well.

This is one of the first interactive EDI standards projects—the first thrust of the airline industry into passenger-side issues. Airlines have a "pseudo-EDIFACT" standard for communications between reservation systems, but this initiative is aimed at providing for the needs of other travel industry players, while at the same time protecting the investment of members such as the airlines that have applications in place.

The initial focus of standards definition has been on data modeling to cover the broad range of reservation functions across the travel industry. Efficiency of real-time messages is of primary concern. The group is now working intensively on prototyping key reservation-related messages; it aims to present these as message design guidelines at the next joint Rapporteurs' meeting in mid-September 1992.

a. Mode-Specific Interactive EDI

Airline-specific interactive EDI is already in use in the following functions:

- Departure control systems (DCS) transactions
- Airline passport information transmitted ahead of international flights to speed up customs clearance

Travel Agency Applications

Travel agents are moving toward developing their own applications to merge information from multiple CRSs, or to otherwise improve the level of service they can provide to their customers.

1. Quality Control/Fare Checking Software

Third-party quality control software products marketed to travel agents provide features to augment airline CRSs, including fare checking and wait-list clearing.

Fare checking systems perform multiple data base queries over a period of time, with the aim of catching lower fares for a client as they become available.

Several of the major CRS vendors announced in 1991 that they would change their fee structure to charge subscribers on a per-query basis, and software vendors have since moved to improve the efficiency of their fare search process and reduce the number of "hits" required for a search.

Vendors of quality control/fare search products include Automated Travel Systems, Aqua Software Products (Santa Ana, CA), and Direct Technology

2. Multiple CRS Access

One of the proposed Department of Transportation regulations on CRS use and competition states that CRS vendors could not prevent subscribers from using the terminals obtained from one vendor as terminals for another system.

DOT is also considering whether each vendor should be required to provide CRS services to travel agents who already subscribe to another CRS, subject to commercially reasonable terms.

This has led to speculation about opportunities for third-party software suppliers on a broad scale. Possible applications include:

- Generic front-end systems that could search multiple CRS data bases
- Broader integrated systems that could access CRSs, other non-air suppliers' systems, and leisure data bases; as well as connect with in-house agency applications such as accounting, word processing, and E-mail

Third-party travel applications vendors looking closely at the new opportunities that opened up CRS competition are listed in Exhibit IV-8.

EXHIBIT IV-8

Vendors of Travel Agency Software

- Autofile (Atlanta, GA)
- TravelPro Technologies (Corte Madera, CA)
- Unisys (Blue Bell, PA)
- Competitive Technologies (Houston, TX)
- Megadata (Bohemia, NY)
- Innosys (Alameda, CA)
- TraveLogix (Jensen Beach, FL)
- Aqua Software Products (Santa Ana, CA)

3. Customer-to-Agency E-Mail

Rosenbluth Travel, a large corporate travel agency based in Philadelphia, has developed a system called E-Res, an E-mail link between the agency and its corporate customers.

Rosenbluth clients will use E-Res to submit travel requests by E-mail. A translation package handles conversion between customers' E-mail systems and Rosenbluth's E-mail. The system is being rolled out to some of the agency's 1,500 corporate clients as of this writing.

E-Res is aimed at reducing bottlenecks in customer-to-agency communications. Rosenbluth, like most agencies, receives most of its requests by phone, and suffers the common problems of phone tag, busy lines, and working-hours time constraints. Rosenbluth promises a 90-minute turnaround on E-mail requests.

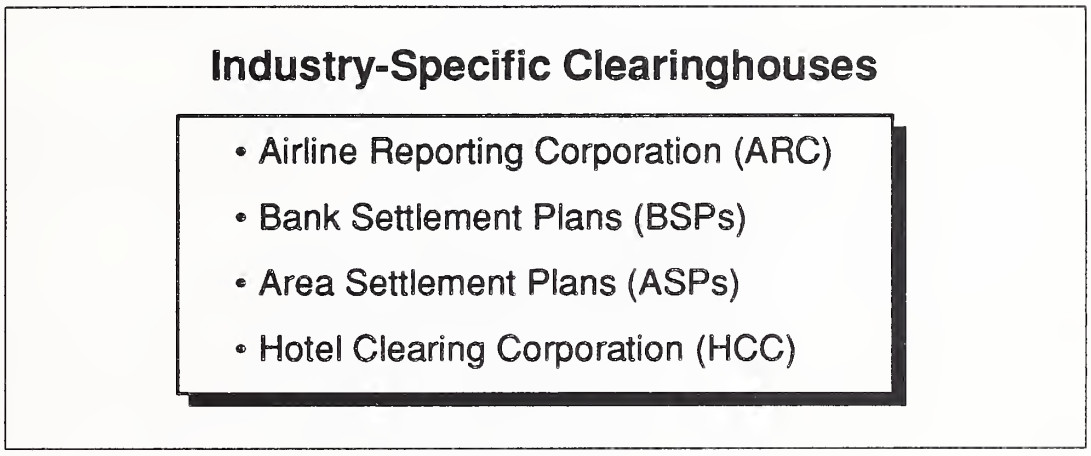
The system pilot requires some redundant data entry, but plans for the next phase are to streamline this process. Currently, agents must call up the customer's E-mail request, book the reservation in another system, then send the customer an E-mail acknowledgment. If customer acceptance of the system proves good, Rosenbluth plans to build an interface to feed E-mail requests directly into its reservation system.

C

Financial Clearinghouses

Efficient ways to distribute payments due to various travel entities for their share of services purchased by a traveler are necessary, and clearinghouses that provide this function are listed in Exhibit IV-9.

EXHIBIT IV-9



1. Airline Clearinghouses (ARC and Others)

The financial clearing process in the airline industry, including distribution of intercarrier payments and travel agency commissions, is coordinated by a number of regional clearing organizations worldwide.

- The Airline Reporting Corporation (ARC) in the U.S. uses a system jointly financed by the U.S. carriers, the owners of ARC.

- Bank Settlement Plans or Area Settlement Plans in Europe and Asia/Pacific regions are other joint industry developments. The International Air Transport Association (IATA), spearheaded standards development and design of turnkey clearinghouses used by the Hong Kong and Australian Bank Settlement Plans.

The airline clearing process is firmly established, some say quasi-governmental. Travel agencies must be certified by the ARC, and must complete a lengthy application process to participate in the ARC clearing process, and to make changes to their status such as adding new ticket printers, or changing or adding locations. The airlines who own the clearinghouses jointly finance the services.

2. Hotel Clearing Corporation (HCC)

In contrast, a new clearing system for the lodging industry called CA$H (Commissions Automatically Settled by Hotels) is being marketed to travel agents as a financial processing service aimed at improving their commission collections and management.

Its sponsors, a consortium made up mostly of large hotel chains, see the system as a means of increasing their market share through increased agency bookings. The CA$H system was jointly developed with AT&T American Transtech.

HCC/CA$H is the first phase of the THISCo initiative, which also includes the UltraSwitch reservations project described earlier in this chapter. HCC began CA$H operations in April 1992, and expects to process $70 million in commissions volume in its first year of operations, growing to $260 million in 1994.

Participating hotel chains pay a transaction fee based on volume, must alter their software, and train their employees to submit guest information weekly to the HCC host computer, via either electronic or hardcopy transactions.

HCC bills the hotels for commissions due to member agents (identified by their IATA or ARC number) and coordinates reconciliation of discrepancies between HCC and hotel records and the HCC system. Commission funds are made available in the hotel's bank, then paid into the HCC bank.

Agents pay a $100, three-year subscription fee for HCC services, plus 5-10% of their total annual hotel commissions. They receive monthly commissions for all their transactions involving HCC member hotels in one payment, via check or direct deposit EFT from HCC's bank. INPUT estimates that HCC revenues for 1992 will be approximately $4.2 million.

With agency commissions averaging $6-7 on a hotel reservation, receipt of payments in a lump also saves the hotels bank fees for currency exchange and deposit charges per check.

HCC member hotels are identified by a code in their CRS record, which HCC hopes will encourage agents to recommend these hotels to their clients, knowing that they are more likely to collect commissions on reservations in which HCC is involved. Some hotel/motel network services applications and their estimated 1992 revenue are shown in Exhibit IV-10.

EXHIBIT IV-10

Selected Network Services Applications for Hotel/Motel Chains

	Estimated 1992 Revenues ($M)
HCC/CA$H	4.2 *
UltraSwitch	1.4
CONFIRM RS	- **
Total	5.6

* For 9 months of operations beginning April 1, 1992
** Release date planned for late 1993

Source: THISCo, INTRICO, INPUT

D

Customer Service Systems

The travel industry sees improved customer service as key to achieving competitive advantage. A major concern is improving travel service levels and reducing customers' waiting time.

New electronic commerce applications that will provide improved customer service while linking multiple travel providers and travel services organizations include 1) self-service ticketing systems, 2) mobile communications systems, and 3) Automated Tickets and Boarding Passes (ATBs).

1. Self-Service Ticketing

A next step in moving beyond reservation systems operated by travel agents to customer service systems operated by travelers themselves may be self-service ticketing systems. These systems have the potential to revolutionize the travel industry in the way that ATMs completely transformed the public's interactions with bank tellers.

In October 1991, the International Air Transport Association (IATA) passed a regulation allowing the dispensing of airline tickets without an authorized person in attendance.

As a result of the IATA ruling, Siemens-Nixdorf Information Systems and American Express UK announced plans to roll out unattended self-service airline ticket machines, to be initially placed in the offices of American Express UK's Travel Services corporate clients in June 1992.

Travelers will continue to book and pay for tickets in the normal way over the phone, but when they book, they will be given a number. Customers can then retrieve the ticket whenever it is most convenient for them by entering the number and their credit card information into a self-service machine.

In the U.S., ARC has developed specifications for the implementation of industrywide electronic ticket delivery networks (ETDNs).

Airlines are investigating the use of self-service kiosks for printing and distributing tickets and boarding passes, performing airport passenger check-in, and advance meal selection.

While flights may still be booked by ARC-approved travel agents, ticket dispensing machines will allow travel agencies to get tickets into their customers' hands without courier delivery of the ticket or the client coming to the agency.

Hotels and cruise lines are also investigating use of on-demand devices, according to airline industry systems managers interviewed by INPUT.

2. Mobile Communications

Ericsson GE and Speedwing Mobile Communications, a division of British Airways, are marketing a mobile data system that operates via radio waves to the global airline industry. The system uses handheld computers equipped with radio modems to communicate with central computer systems so that, instead of passengers lining up at a counter, passenger service agents to come to the customers.

In pilot tests at Heathrow and Newark (NJ) airports, the system has been used to link fueling crews, baggage handlers, caterers, and reservations agents. Initial testing has been within British Airways' organizational units, but the system may be used to link multiple travel organizations, such as third-party handling agents or other carriers for connecting flight information

3. Automated Ticket and Boarding Pass (ATB)

The magnetically striped piece of cardboard that has finally found its way into many ticket jackets represents a customer service automation advance that is shared by airlines, and demonstrates the patience required in gaining acceptance for and jointly funding such technology initiatives in the airline community.

In 1990, IATA members finally adopted an intercarrier agreement on a common format for encoding data on ATBs, and airlines have agreed to implement the ATB worldwide by April 1996.

The technology has been a long time in coming into use—an airline systems manager interviewed by INPUT noted that the technology has been available for 25 years, and Stan Mason of British Airways is quoted in *Airport Services* magazine taking an even longer view. "It has taken us 60 years to achieve" a standard travel document, he says, alluding to the ATB and the standard ticket developed by IATA.

Key functions and benefits of the ATB are:

- The standards for magnetic data encoded on the ATB allows on airline's reader to decipher the information on another carrier's boarding pass.

- ATB readers now being installed at airport counters will call up a passenger's full record, and will also be linked to their bar coded bag tags for passenger/baggage reconciliation.

- The passenger will slide the boarding pass portion of the ATB through a reader at the gate, which will verify that the passenger is boarding the correct plane, that checked baggage has been loaded, and whether there are any seating conflicts such as someone already being in the passenger's assigned seat.

- Gate personnel will receive an immediate readout of passengers boarded and seats occupied, for faster processing of standby passengers.

- When the aircraft leaves the gate, passenger and baggage information will be sent via real-time EDI transactions to the next airport, to speed up handling upon the flight's arrival. The airline's reservation system and, potentially, its revenue accounting system will also be updated at this time.

- Airlines see the ATB as a potential solution to passengers' most common complaint about service: departure delays. In Japan, where ATBs have been used for years on domestic flights, airline industry officials note that Japan Airlines has shown that the system allows it to board 500 passengers on a 747 and leave the gate in 21 minutes.

- Some airlines have also speculated that the ATB could lead to smart cards being used to buy tickets, gain entrance to boarding areas, preselect meals, order drinks, record frequent flyer mileage, redeem awards, and make duty-free purchases.

- Beyond this, representatives from the travel systems community have proposed the use of ATBs to record all trip details, from flight seats to hotel rooms, rental cars, and other service arrangements.

E
Operations and Maintenance

Passenger air carriers are using EDI to purchase fuels and spare parts from suppliers, through two major EDI capabilities and standards initiatives led by industry organizations such as the Air Transport Association in Washington, D.C., and the International Air Transport Association in Montreal, Canada.

1. Specification 2000

Begun in the 1950s, Specification ("Spec") 2000 is one of the oldest EDI developments in the world. Passenger airlines use the system to purchase airplane spare parts from manufacturers.

The system is managed by the Air Transport Association (ATA) in Washington, D.C.; Société Internationale de Telecommunications (SITA) and Airinc in the U.S. provide the network services for the project.

Approximately 60 airline companies worldwide use Spec2000, and 75 to 80 major parts manufacturers conduct business over it. The system captures roughly 70% of the expenditures airlines make for replacement parts and supplies.

Spec2000 enables airlines to send computer-generated purchase orders for airline parts. Its transaction sets cover POs, PO acknowledgments, invoices, and air waybills.

The system uses its own industry-specific data formats, but will move to ANSI X12 and possibly other standards like EDIFACT and UCS as standards are adopted by a critical mass of its users.

In 1989, Spec2000 launched an on-line data base service that assists airline companies in ordering aircraft parts from manufacturers. The service is similar to the UPC/product catalogs offered by network vendors in the retail industry. Airlines periodically dial into the data base and download product and price information into their own ordering systems.

2. AVNET

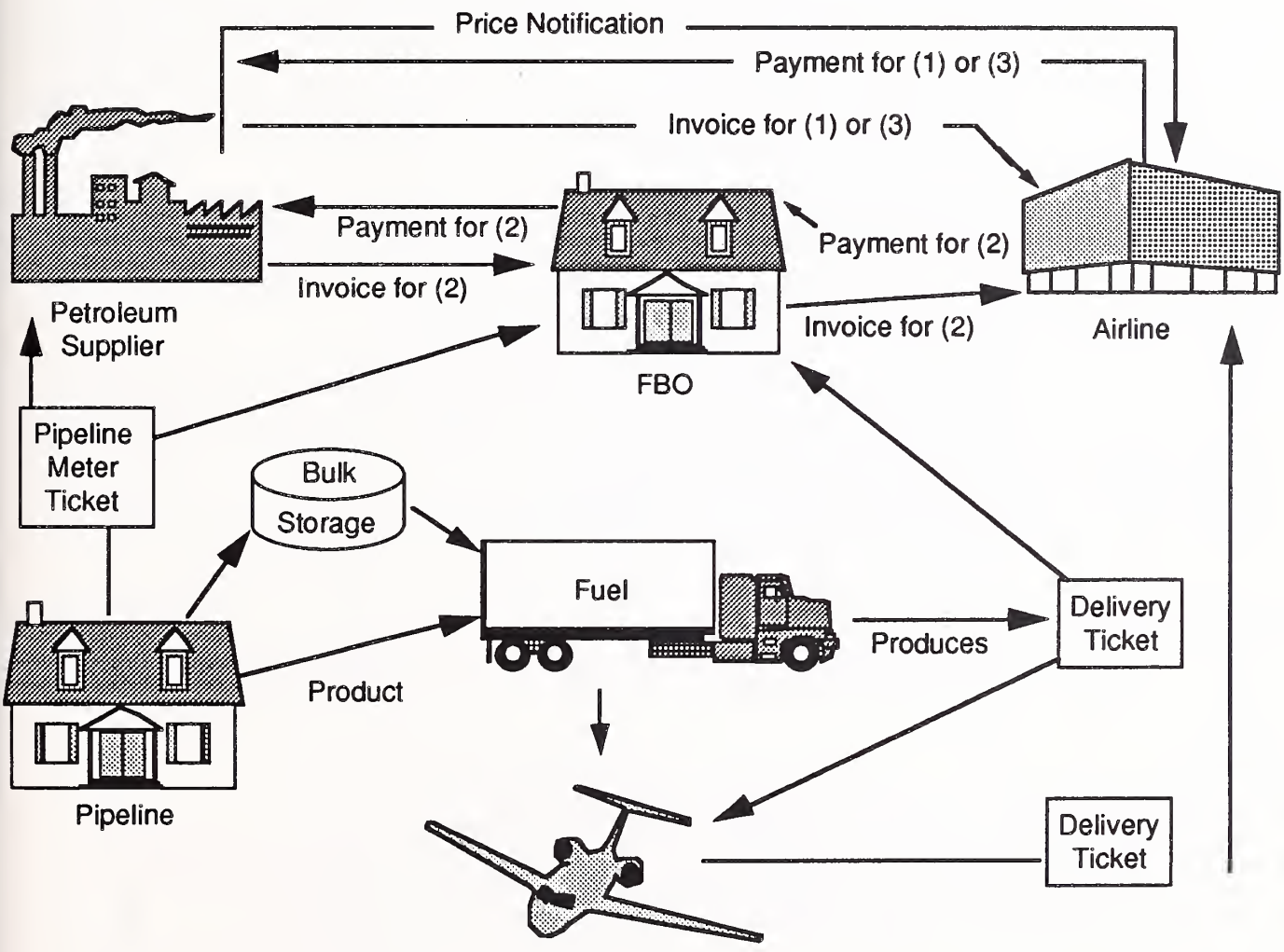
Also launched in 1989, AVNET supports movement of jet fuels at airports. The project is a joint venture of the airline and petroleum industry EDI committees from the ATA and the American Petroleum Institute's EDI organization, called PIDX (Petroleum Industry Data Exchange).

Both the airline and petroleum industries have been long-time EDI users—the airlines with Spec2000, beginning in the 1950s, and the petroleum industry with PIPENET, an EDI system for petroleum pipelines and their trading partners.

Exhibit IV-11 shows the AVNET transaction model.

EXHIBIT IV-11

AVNET—Business Transaction Model



Fuel to:
(1) Airline owned or
(2) FBO owned or
(3) Consigned to FBO

Transactions are:
1. Fuel invoice (FBO to airline petroleum supplier to airline petroleum supplier to FBO)
2. Delivery ticket (FBO to airline, FBO to petroleum supplier)
3. Price sheet (petroleum supplier to airline)

The system supports price notification, delivery tickets, invoices, and payment using ANSI X12 formats (832, 861, 810, and 820). Currently, the group is moving for EDIFACT sanction of the transaction sets, which were developed by an international body composed of European, Asian, North American, and other regional air carriers and oil companies.

F

Air Cargo

Although the purpose of this report is to examine developments in travel and tourism systems, passenger and freight transportation are linked because passenger air carriers are also active in the cargo market—the belly cargo capacity of the top 11 U.S. passenger carriers comprises 46% of the cargo market (as measured in revenue ton-miles), according to the U.S. Department of Commerce.

Airlines sponsoring development of new cargo systems hope that electronic links to freight forwarders will help their cargo business by cementing their ties to their distributors, the freight forwarders, in the same way that CRSs brought them closer to travel agents.

A number of cargo EDI initiatives have emerged in the past 2-3 years, each with similar functional goals, but slightly different in their breadth of sponsorship and strategic direction.

Briefly profiled below in Exhibit IV-12 are recent electronic commerce initiatives related to air cargo involving passenger air carriers.

For more comprehensive coverage of this subject, please see INPUT's related report, *Electronic Commerce in Trade and Transportation.*

EXHIBIT IV-12

Air Cargo Systems

- Carrier Plus One - UAL and freight forwarders
- Scitor, Inc. - Air Forwarders' Association
- Encompass - AMR and CSX (formerly Global Logistics Venture)
- Traxon Worldwide - 10 European and Asian carriers (formerly Global Logistics System)

1. UAL's Carrier Plus One

Launched in 1990, Carrier Plus One is a live inventory management system that allows the freight forwarders or consolidators who form UAL's ground support network to track cargo movements on UAL's 2,000 daily flights.

The system operates on United's Unisys mainframe, and is accessed by the forwarders and consolidators via links to their mainframes or PCs.

Carrier Plus One is currently being upgraded to carry booking and tracking information from other airlines yet to be named, and to incorporate EDI links to U.S. Customs.

2. Air Forwarders' Association/Scitor, Inc.

A division of the airline telecommunications network organization, SITA, Scitor has been working with the Orange, California-based Air Forwarders' Association on a system planned for launch in September 1992.

The system is said by freight forwarders to have the broadest appeal of current cargo EDI developments, because it is being designed to link them with any of the major carriers' cargo control systems.

It will allow freight forwarders, who form the air carriers' ground support network—delivering shipments to airports for cargo flights and picking them up at destination airports—to track cargo movements while in the air.

All the major U.S. carriers have agreed to link into the system, but several are also developing their own proprietary systems.

3. AMR and CSX's Encompass

Encompass (formerly known as Global Logistics Venture, or GLV), is a multimodal electronic logistics system, with the broadest functionality of the three cargo EDI systems described here. It is also the most controversial, because some freight forwarders see it as a potential threat to their role as air cargo middlemen.

The system is a joint venture formed in 1989 by American Airlines and CSX Corporation, a transportation holding company providing rail, container shipping, intermodal trucking, and barge services. AMR and CSX say they have each invested $10 million in the project, and estimate the market potential for products of this kind at $1.6 billion annually.

Launched for pilot testing in April 1992, Encompass manages all aspects of cargo shipping, including trucking, shipping, rail, and air transportation, with the purpose of helping global trading partners expedite the movement of goods, check the status of cargo in transit, select transportation routes and modes, and better manage inventory levels. It also provides certain value-added services such as international document preparation.

Encompass will sell its services directly to large corporate shippers. Test sites as of this writing are Procter and Gamble and Digital Equipment Corporation.

4. Traxon Worldwide

Formerly known as Global Logistics System, this system is a joint venture initiated by four international carriers: Cathay Pacific Airways, Ltd., Air France, Japan Airlines, and Lufthansa German Airlines.

Six additional airlines—KLM Royal Dutch Airlines, British Airways, Singapore Airlines, Air Canada, Aer Lingus, and Swissair—have recently joined the founders listed above. Although invited to do so, no U.S. carriers have signed up with this group.

G
Traveler Information

With the growth of personal computing technology and on-line services aimed at consumers, it is inevitable that travelers are now users of a small part of the travel and tourism electronic trading network.

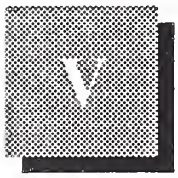
It is not INPUT's aim to examine all the many information products and services now available for the personal or business traveler to plan trips, account for frequent traveler mileage, conduct business while traveling, or make travel-related purchases.

Products or systems that have bearing on electronic commerce include the following:

- Simplified versions of major CRSs, now available through on-line services such as Prodigy and CompuServe

- Consumer-oriented products such as The Official Airline Guide (OAG) on disk, and various automated trip and vacation planners on magnetic disk or CD ROM

Impacts and opportunities from these and the other developments discussed in this chapter are examined in Chapter VI of this report.



Competitive Environment

Electronic commerce-related services are provided to the travel industry by a diverse group of vendors and industry organizations. Below is a sampling of some players key to the travel information services market.

A
Electronic Commerce Vendor Profiles

1. Computer Reservation Systems

a. Covia Partners, 9700 W. Higgins Road, Suite 400, Rosemont, IL 60018, 708-518-4000

Covia was established in 1987 as the technology division of UAL Corp., parent of United Airlines, and vendor of the Apollo reservation system. Covia also provides information services to the travel industry and to United Airlines. United reported 1990 Covia revenues of $456 million, of which perhaps 30-40% came from services for United.

Four or five percent of Covia revenues come from services to outside firms such as financial and insurance companies needing on-line real-time data. An agreement with IBM, announced in January of this year, allows IBM's sales force to market Covia's Communications Integrator, an interoperability product for users of IBM's TPF and MVS operating systems, to these companies.

Covia has over 2,000 employees, and as of April 1992, 49,000 Apollo terminals were installed in U.S. travel agencies.

Covia's initiatives outside the airline CRS arena include the C/LAS International hotel reservation and marketing service jointly developed with Loews Hotels, and Covia Partnership.

b. SABRE Travel and Information Network (STIN), PO Box 619616, DFW Airport, TX 75216-9616, 817-963-2009

The SABRE Travel and Information Network develops and markets the SABRE reservation system and related products for the agency community.

INPUT estimates that 1991 SABRE revenues alone were over $500 million. STIN employees number around 2,000, and there are over 96,600 SABRE terminals in travel agencies.

Now AMR is looking to leverage the information services expertise gained from SABRE through specialized information services boutiques under its six-year-old AMR Information Services division (see profile below).

2. Professional Services

The services firms profiled below are large vendors, each with a different approach to the travel information systems market: AMRIS entered the services business as an air carrier known for its successful deployment of information systems; Andersen Consulting comes from a Big Six background and has built a global organization into a major systems integration business; and EDS began as a facilities management firm.

Other significant players in travel industry services include British Airways' Speedwing unit and Perot Systems.

a. American Airlines Information Services, Inc. (AMRIS), 4255 Amon Carter Blvd., MD 4300, Fort Worth, TX 76155, 817-963-3958

AMRIS was established in 1986 as a subsidiary of AMR Corp., the parent company of American Airlines. AMRIS has been described as a "bevy of smaller businesses" providing specialized information technology products and services, building on the information management, travel, and airline systems expertise developed internally at American Airlines and SABRE.

AMRIS' 1991 revenues were approximately $150 million, and the unit had 5,000 employees as of March 1992.

AMRIS has five divisions, three of which are described below. The remaining two divisions operate aviation maintenance and travel vocational schools, and provide data entry and data switching transaction processing.

- Transportation Automation Services (TAS) serves primarily airline and railroad clients worldwide, providing software products and systems integration and development services. The division has been primarily replacing airline customers rather than signing up additional clients due to the difficult times in the airline business and the high rate of carrier mergers and failures. Its current revenues are approximately 60% from airlines and 40% from rail products and services, largely a result of AMRIS' partnership with the French National Railroad in developing the RESARAIL 2000 reservation system.

  TAS products include the following:

  - SABRE and SAAS are shared airline reservation and airport operations systems offered as a processing service to air carriers. Travel agency use of SABRE is part of a separate AMR division, the SABRE Travel Information Network (STIN). Seat inventory and yield management decision support products are provided by another AMR division, American Airlines Decision Technologies (AADT).

  - FOS (Flight Operation System), another multihost system, provides centralized flight operations support such as weight and balance, fuel burn, flight speed, and routing information

  - INFORM is a PC-based airport flight information display system for providing departure and arrival information at airport gates. INFORM customers may be either airports purchasing the system for use by multiple carriers, or individual carriers, particularly large carriers that have their own terminal or concourse within an airport.

- The Travel Services division serves primarily hotel and car reservations companies. It develops reservation software and provides other data processing services such as data center operations, management of central reservation systems, hotel property management, and management information systems. This division is responsible for the development of the CONFIRM reservation system, a joint hotel/car rental reservation system financed by the INTRICO consortium of Hilton, Budget, Marriott, and AMRIS. At press time for this report, this project was cancelled.

- TeleService Resources, Inc. provides telemarketing and telephone voice reservation services. It also offers a meeting planning data base product for meeting planners and hotel marketing groups called the Meeting Services Network. This product links planners electronically with information on meeting sites and suppliers.

b. Andersen Consulting, 69 W. Washington St., Chicago, IL 60602, 312-580-0069

Andersen's travel industry practice is one of seven major market segments covered by the firm's Products group, which earned $971 million in revenues in 1991, or 43% of total Andersen Consulting revenues of $2.26 billion. INPUT estimates that travel and airline services earned Andersen approximately $100 million in 1991. Seventy-five percent of Andersen's travel-related revenues are from airline services. The geographic split of this business is 80% U.S., 20% international, with the international segments growing faster than U.S. travel business.

Andersen has successfully used its size (over 20,000 consultants worldwide; 151 offices in 46 countries) and expertise in financial systems stemming from its origin as a division of the Big 6 audit and tax firm of Arthur Andersen to build a travel industry practice that is particularly strong in airline revenue accounting and global/large-scale implementations. Other travel service areas include maintenance and engineering systems, productivity improvement, and customer service systems.

Examples of recent electronic commerce-related travel systems contracts include:

Andersen has developed major revenue accounting systems for Northwest and United Airlines, and other U.S. and international carriers. While not strictly an interorganizational systems function, revenue accounting is an example of a highly profitable "niche" resulting from the complexity of the financial transactions between air travel trading partners.

In the reservation systems arena, Andersen has developed the carrier and travel agency support systems for AMADEUS, and a UNIX-based reservation system for a major hotel chain. Key to Andersen's role on both projects was its ability to develop common global functionality and facilitate localized training, support, and implementation on a broad geographic scale. Both systems also required multiple language user interfaces.

The AMADEUS travel agency front-office and back-office functions are currently being installed in European agencies. The hotel system, with embedded training, is being rolled out worldwide.

c. Electronic Data Systems (EDS), 7171 Forest Lane, Dallas, TX 75230, 214-604-6000

Although EDS has been active in the travel and transportation sector for over twenty years, its 1991 association with System One has added significantly to the company's travel technology products and services. EDS paid $250 million for 50% ownership of System One and its Airline Services Division, which had a business base of 170 airline customers and

1,860 employees. EDS was also awarded a 10-year outsourcing agreement with Continental Airlines and System One, valued at $2.1 billion at that time. EDS as a whole has 70,000 employees in 30 countries, and earned approximately $7.1 billion in 1991.

The company also has an outsourcing agreement with National Car Rental, signed in 1991, under which EDS plans to market services based on National's software to other vehicle rental companies.

EDS' travel-related products and services include SHARES, a shared airline reservation system that includes reservations, seat inventory management, and airport operations functions, as well as several other marketing, management, engineering, operations, and customer service applications.

EDS plans to offers EDI services to airlines, including direct sell interfaces for real-time electronic linkages between SABRE and host airline reservation systems.

3. Network Services

Airinc and SITA are the two main communications services for the airline industry, and serve as the intermediaries between the airline and FAA networks and systems, which don't interoperate. Private networks such as GEIS and BT also provide services to the travel industry.

a. Société Internationale de Telecommunications Aeronautiques (SITA), Paris, France

A Europe-based trade association for worldwide airline companies, SITA has 28 major airlines as members and operates an international data communications network for its members. The U.S. part of the network is run by Airinc (see profile below). One major electronic commerce application using the SITA network is Spec2000 (described in Chapter IV of this report).

SITA also has a multihost reservations and operations system known as Gabriel, which is used by small-to-medium sized international carriers.

b. Airinc 2551 Riva Road, Annapolis, MD, 21401 (301) 266-4000

A non-profit organization that provides communications services to the airline industry operates the Airinc network. Airinc is currently working to expand the network with an OSI-based architecture to be called Aeronautical Telecommunications Network (ATN). ATN will initially connect U.S. and international airlines and the Federal Aviation Administration. It is expected to become the infrastructure network for global communica-

tions among air carriers and travel agents connected to computer reservation systems. One of Airinc's operating companies is Aeronautical Radio Inc., which is developing the new network. Aeronautical Radio Inc. operates the existing communications network services of Airinc.

To connect airline networks to FAA networks and systems, a packet switching messaging system—the AIRINC Data Network Service—executes the necessary protocol conversion between the various types of networking systems so that messages can pass between airlines and their trading partners regardless of differences in the communications technologies those parties use.

Airinc's messaging system handles some five million messages per day and links about 500 user organizations in the airline community worldwide, providing applications for air traffic operations and reservations.

Aeronautical Radio also provides a VHF-based system, the Aircraft Communications and Reporting System, which sends flight data to and from aircraft.

4. Airline Industry Organizations

Just as SITA and Airinc together provide worldwide telecommunications support for the airline industry and its trading partners, two airline professional associations (IATA and ATA) facilitate the development of electronic commerce systems and EDI standards for the airline industry and its trading partners.

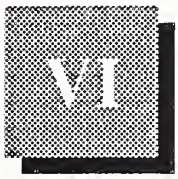
a. The Air Transport Association (ATA), 1709 New York Avenue NW, Washington DC 20006-5206, 202-626-4000

The ATA, originally founded in 1936 to "promote the betterment of the airline business" has evolved into a large industry organization of which virtually all U.S. scheduled airlines are members, and two Canadian carriers are associate members. An objective of the ATA is to conduct selected industrywide programs that can be carried out more efficiently on a common industry basis, including the development of information technology standards.

Key electronic commerce developments in which the ATA has played a primary role include Spec2000, AVNET, and the development of interactive EDI reservations standards for the travel and leisure industry (see Chapter IV for details).

b. The International Air Transport Association (IATA), 2000 Peel Street, Montreal, PQ, Canada H3A 2R4, 514-844-6311

IATA, with 204 international air carrier members, has focused its technology standards efforts on the development of airline-specific EDI transactions, including recent work in reservations and departure control systems messages. IATA has also developed an international clearinghouse system, document standards for airline tickets (i.e., "the standard ticket" used by all IATA carriers), and airline passport information standards for speeding customs clearance for travelers.



Opportunities and Impacts From Electronic Commerce In Travel and Tourism

A

Overview—Penetration of Electronic Commerce, Economic Impacts, and EC-Related Expenditures

Electronic commerce systems are more pervasive in travel and tourism than in other trading communities examined by INPUT.

The airline sector in particular is a classic example of a market in which the "product" (air transportation) is highly standardized, and a majority of its transactions are carried out electronically.

- Most U.S. airline tickets are issued by travel agents using CRSs that provide so-called "perfect information," i.e., one-stop shopping that allows users to compare schedules, routes, and fares for competing carriers. Since the introduction of the first reservation systems in agencies in the mid-1970s, the percentage of flights booked by agents has grown from 40 to the current 80-plus percent.

- Electronic information can bring about such marketplace efficiency that the product begins to attain the status of a commodity, and profitability is impacted.

- In a highly automated trading community such as the air travel sector, buyers know prices and where things can be bought for the best bargains. Price competition intensifies to the point where sellers are "at the mercy of their dumbest competitors"—AMR CEO Robert Crandall's comment on recent price wars in which airlines were forced to match low fares.

A measure of the degree to which electronic trading has penetrated a marketplace is how much money electronic commerce systems are generating compared to how much money the overall trading community is generating.

In the travel industry, this ratio of expenditures to output is greater than in the grocery, transportation, and health care sectors, and is shown in Exhibit VI-1.

EXHIBIT VI-1

Travel and Tourism Electronic Commerce versus Other Industries

Trading Community	Ratio Expenditures vs. Output (Percent)	Electronic Commerce (Percent)
Travel and tourism	$3.6 billion/$312.6 billion*	1.1
Grocery	$1.8 billion/$540 billion**	0.3
Transportation	$260 million/$122 billion**	0.2
Health Care	$800 million/$676 billion**	0.1

* INPUT, U.S. Department of Commerce

** Other INPUT Electronic Commerce reports

CRS and credit card processing revenues make up the majority of travel and tourism electronic commerce expenditures, as discussed previously in Chapter IV and shown below in Exhibit VI-2.

Although credit card payment transaction processing comprises a major part of total electronic commerce-related expenditures, INPUT sees developments in applications specific to travel-related commerce—airline reservation systems and related businesses—as having the greatest impact on the travel and tourism community.

- CRSs, in the midst of the shifting economics described above, are evolving to meet the demands of a new regulatory climate, redefine their role in the airline business, and upgrade aging technology.

- Developers of emerging systems (reservations and payment applications for non-air travel sectors) are moving to fit into the existing EC infrastructure, apply what they have learned from the lessons of their predecessors, and make use of electronic trading to define their markets to their own advantage.

EXHIBIT VI-2

User Expenditures on Key Electronic Commerce Software and Services

Software/Service	1992 Expenditures ($ Millions)
Computer reservation systems	1,500
Non-air network applications	6
EC-related systems development	250
EDI software	3
Shared airline systems	16
Credit card processing services	1,835
Total	3,610

- EC-related systems development (including new reservation and payment applications and back-end systems that interface with EC systems), EDI software, and shared airline systems are all businesses related to computer reservation systems. They process CRS transaction flows, enhance/extend CRS services, and/or build on the customer relationships developed by CRS owners.

B

Who Is the User? Who Is the Vendor?

There is a large gray area between users and vendors in the travel sector, as an increasing number of large user organizations form information services subsidiaries or band together in joint electronic trading ventures.

INPUT puts users in the travel and tourism industry into three broad groups that each face a different set of electronic commerce systems issues in the 1990s:

- Airlines, traditionally the information systems powerhouses of the industry, and owners and developers of the EC travel systems infrastructure

- Non-air travel services providers, developers of emerging EC applications

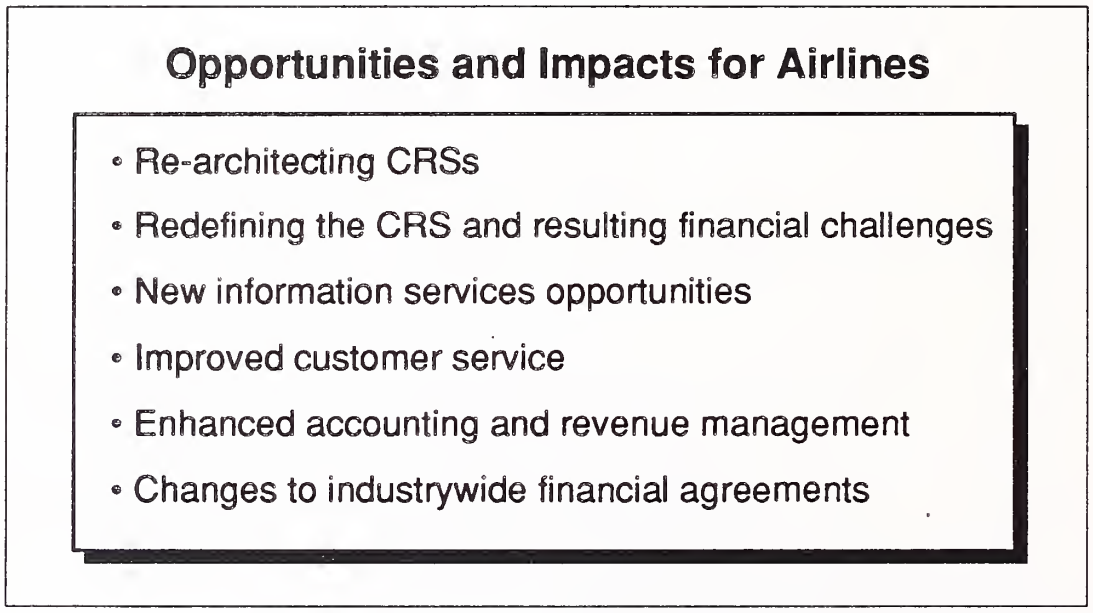
- Travel agencies, the "middlemen" who conduct their business using these evolving and emerging network applications

For the purposes of this discussion, INPUT also considers CRS developments user issues, since airline develop CRSs and use the systems to distribute their services.

C

Opportunities and Impacts for Users: Airlines

EXHIBIT VI-3



1. Re-Architecting CRSs

Airlines face the challenge of updating their aging reservation systems to keep pace with current technology developments, while confronting the need to cut costs due to competitive and economic pressures. As the size and complexity of CRSs have grown, so have development and maintenance requirements and costs.

SABRE, Apollo, and the other established CRSs grew out of centralized airline reservation systems developed in the 1960s and 1970s. SABRE originated from an internal inventory management tool of which development was begun in the late 1950s. Even before it was placed in agencies, the functional scope of the system had expanded to support flight planning, spare parts tracking, crew scheduling, and management decision making.

After the systems were established as distribution vehicles and placed in agencies in the 1970s and 1980s, they grew to include increasingly objective flight information on a wide range of carriers, as well as reservations support for other travel related services. Exhibit VI-4 shows some key statistics on the Apollo system, which give an indication of the enormous size of CRSs today.

EXHIBIT VI-4

CRS Size and Scope: Apollo

- Capacity Measures:
  - Uses 18 mainframes and "countless" backup systems
  - Processes 1,700 entries per second
  - Connects 44,000 terminals and 20,000 ticket printers
  - Includes 2,600 data circuits covering 548,000 miles
- Types of Bookings Supported:
  - 740 international, national, and regional carriers
  - 37 car rental companies
  - 131 hotel companies and 21,000 hotel properties
  - 40 other suppliers (includes limousine services, cruise ship firms)

Source: Covia, 1992

CRS upgrades under way include the following:

- Replacing dumb terminals with intelligent workstations, and developing workstation-based agency-specific productivity tools
- Paring down the systems to support functional processing. Apollo and SABRE have distributed functions such as fare quotation and crew scheduling from their central systems, and this process of decentralization will continue into the 1990s.

- Developing direct links between carrier-specific systems and host CRSs. The existence of a CRS partnership is not a guarantee that real-time interfaces exist between all the carriers and the host, but market pressures to neutralize the systems will continue to drive the building of these links.

- Removing bias from CRS displays, features, services, and functionality. Worldspan's new system, due out in 1993, is being positioned as the first system developed specifically for the agency market, and with neutrality as a goal. The combination of growing competitive and regulatory pressures in the 1990s will impel system upgrades aimed at providing objectivity.

New reservations-related applications are increasingly being developed on separate platforms using software packages rather than custom development approaches.

- For example, when SABRE developed its Integrated Tours System in the late 1980s, it used a DEC VAX cluster as the platform, and Autofile's automated tour operations software as the starting point for the system. AMR's Max Hopper commented, "If we had done this within SABRE, it would have taken us at least another year."

2. Redefining the CRS and Resulting Financial Challenges

A new definition of the role of the CRS is emerging. Once viewed as a marketing tool that offered its owners strategic benefits through screen displays and functionality favoring the owner's flights, today it has become more an information resource for agencies and travelers.

This transition from single-source or biased sales channels to unbiased electronic markets means that the systems have become necessary and costly tools for doing business.

CRSs have passed the stage where they could be used to secure customer relationships, but they are now the primary channel for the industry, through which 85% of airline tickets are sold. And they have grown so large and complex that the cost of maintaining and enhancing them in response to regulatory and marketplace demands is enormous.

One CRS manager interviewed by INPUT justified the existence of the systems on the basis of booking fees that would have to be paid to other carriers if all of the owner airlines' passenger travel volume came from tickets booked on their own systems. Profitability, it appears, is no longer even a goal of most systems.

The flood of CRS mergers and alliances beginning in the late 1980s has been an initial response to increasing costs and decreasing margins. Most have been alliances between carriers, or expansions into related travel markets through agreements with other travel players (e.g., AMR's Confirm initiative with Budget, Hilton, and Marriott).

There has also been speculation about alliances between CRS vendors and technology firms, which may be better positioned to expand the technology side of the business and let the airlines return to focusing on operations and transportation issues.

However, Worldspan/AT&T discussions in 1990 did not end with a deal, and the 1991 EDS/System One purchase announced in 1991 fell through.

A longer term alternative is to try to reduce the industry's dependence on the CRS as its nearly exclusive channel of distribution. Possibilities mentioned by SABRE's President Kathy Misunas include greater reliance on in-house reservations, satellite ticket printers, tickets by mail, putting reservation calls through to another entity, and direct sales to clients such as corporations.

Southwest Airlines, the only carrier of the 10 major U.S. airlines that is expected to show a profit for 1992, sells its seats almost exclusively through direct (non-CRS) channels, and does not have interlining agreements with the other carriers. Perhaps there is an important lesson here for carriers re-evaluating the role of the CRS in their businesses.

3. New Information Services Opportunities

Airlines are exploring new information services ventures that make use of their accumulated technology expertise. Many of these initiatives have been chronicled throughout this report:

- AMR's AMRIS information services subsidiary earned $150 million in 1991 through its five business units, which function as specialized information services "boutiques."
- AMRIS, System One, and SITA offer shared airline reservation and operation systems to other carriers as a processing service.
- Covia and AMRIS have moved into non-air reservations, focusing on hotels, car rental, and rail transportation.
- Covia is also targeting non-travel sectors such as the finance and insurance sectors, transaction-oriented companies that need fast and consistent access to on-line, real-time data, through its interoperability product for users of IBM's TPF and MVS operating systems.

Though these efforts are scattered and not on the scale of CRSs, they offer the advantage of providing a return on airlines' technology expertise without being tied too closely to their core business.

This distinction allows the carriers to assume a more detached role. They can walk away from unprofitable systems ventures because they are not an integral part of their business infrastructure. Still, involvement in major travel industry initiatives allows airlines an influential role in shaping electronic trading initiatives in other travel sectors, which may affect their own core businesses.

4. Customer Service Improvements

Airlines' current emphasis on customer service may provide the technology and functional re-engineering for the next phase of electronic commerce in the industry. Airline and other travel industry players are now developing systems to support self-service ticketing, mobile customer service agents, automated boarding passes, and other service-oriented applications (see Chapter IV, Section D).

Even internal airline systems such as United's new client/server service applications may evolve into community-wide applications, given the highly interconnected nature of the industry.

- Covia Technologies has developed LAN-based desktop applications for United that automate functions from printing baggage tags and meal vouchers to tracking luggage, with the aim of moving a greater number of passengers through airports more efficiently. Each airport LAN is connected to others by a number of long-distance hookups, allowing reservations made in Chicago, for example, to be immediately accessible in Denver.

Customers will demand the same level of service on interlining trips as when flying with a single carrier. Airports, where most of these systems function, are designed to support linkages between carriers, and the industry already has extensive experience to build upon in sharing technology and developing cooperative systems and policies.

How these new technologies will play out in the 1990s remains to be seen, since many of the systems are still in their infancy.

- Whether mobile customer service systems will eliminate service counters, result in a transformation of airport floor plans, or significantly change how travelers spend their time waiting for flights is not yet known.

- The possibilities for self-service kiosks to assume a role analogous to that of automated tellers in the banking industry, or whether ATBs will emerge as the "smart cards" of the air travel industry, remain only possibilities at this time.

Whatever their outcome, these early initiatives have notable implications for airlines. They have the potential to provide significant advancements in service—a highly visible area in which improvements shown by early adopters may win new customers. New customer service systems and technologies may also impact operations to the extent that advantageous streamlining of workflows will result, both within individual carriers and community-wide.

5. Enhanced Accounting and Revenue Management

The financial and economic pressures on the airline industry in recent years have resulted in a need to cut costs and maximize revenue. The sheer complexity of airline financial processes presents numerous areas for improvement through systems designed to provide specific financial management improvements.

Examples of two systems opportunities include: tightening up auditing and reporting through more powerful revenue accounting systems, and improving yield management and pricing capabilities by extending the scope of revenue management decisions.

Revenue accounting and even revenue management systems are not electronic commerce systems by definition, since they do not facilitate electronic trading between partners.

But they are needed largely as a result of the high volume of transactions, the variability of competitive pricing, and the size of the vast network of electronic trading relationships within the air travel community.

a. Accounting Systems Issues

Two examples illustrate the kinds of problems air carriers face in accurately accounting for revenues and expenses:

- Cathay Pacific says its booking fee payments to CRS vendors are four times what the number of passengers suggests they should be. The gap is comprised of either errors that can't be traced or value-added charges assessed each time a reservation is changed.

- Until recently, Northwest Airlines determined its passenger revenues based upon a statistical sampling of tickets collected at boarding time. Extrapolating total revenues from a small percentage of passengers was an industry-accepted norm. The sampled tickets represented approxi-

mately 5% of Northwest's 20 million tickets sold per year. (A case study of Northwest's new revenue accounting system follows this section.)

Much of the complexity of airline reservations and payment processes is due to the fact that these processes extend beyond a carrier's own organization and involve trading relationships with partners that are also competitors, intermediaries, and clearinghouse organizations.

- More than 80% of bookings and tickets come from CRSs, not the carriers themselves.

- Once cut, a ticket can be used like a monetary instrument. Barring restrictions and depending on circumstances, it can be returned for refund, exchanged for a completely different itinerary, or changed as to schedules, destinations, service levels, and carriers.

- The amount a customer pays for a ticket is split between the carrier or carriers whose flights make up the itinerary, CRS booking fees, travel agency commissions, and applicable taxes and tariffs.

The Cathay Pacific scenario above has implications for CRS fee thresholds, as well as showing the need for improved accounting for fares, commissions, and booking fees.

- It indicates that CRS booking fees may be reaching a point at which the systems are no longer economical for airlines to use. This is bad news to CRS owners, who are struggling to support the cost of developing, operating, and maintaining these systems at the same time the role of the CRS is in question (discussed in Section B of this chapter).

- Opportunities for improving revenue accounting are discussed below, in the context of Northwest's new system.

b. Revenue Accounting Case Study: Northwest Airlines

Improving revenue accounting is a trend throughout the airline industry because limited capabilities in this area mean lost revenues due to inaccurate ticket pricing calculations.

Northwest developed a new revenue accounting system that allows 100% of passenger information to be audited to correctly determine carrier revenues. The airline's previous system depended on statistical sampling of only a small percentage of passengers to account for revenues.

Design of the new system began in 1988, and was operational as of early 1991. Andersen Consulting, systems integrator for the Northwest project, has also been involved in development of similar systems for United Airlines and other U.S. and international carriers.

The Northwest system matches three types of records to determine revenues: the computerized reservation, the audit coupon turned in by the travel agent, and the flight coupon turned in by the passenger upon boarding.

If revenues were based only on computerized reservations, refunds and inter-airline transfers would not be accounted for, misrepresenting agency commissions. One hundred thousand fare changes per day make the process particularly difficult.

The new system uses a client/server architecture with a large DB2 mainframe server and 400 Sun UNIX workstations. A front-end OCR scanner stores passenger and fare information for auditing tickets and fares. Exhibit VI-5 lists additional facts and figures for Northwest's revenue accounting system.

EXHIBIT VI-5

Northwest Airlines' Revenue Accounting System

- Technical Environment:
  - Workstations: Sun Microsystems (400 distributed, networked)
  - Servers: Sun and FileNet
  - Document scanners: Bell & Howell REI Trace 1000-APS
  - CASE software: Andersen's FOUNDATION
  - DBMS: DB2, Sybase
  - Operating systems: UNIX, Sun/OS, AIX, and MVS
  - Networks: Ethernet, NSC, Hyperchannel, SNS, TCP/IP, LU6.2, NFS 3770 RJE
- Processing Volume:
  - Flight and audit coupons scanned daily: 170,000
  - Scanning rate: 17 coupons per second
  - Tickets per day: 60,000

Source: Andersen Consulting, 1991

Knowledge-based artificial intelligence technology is used to automate the reasoning and rules processing behind ticket auditing, including fare, tax, and commission parameters.

Correctly priced tickets are automatically recorded into Northwest's general ledger and revenue journals. Those containing errors (called violations) are sent to clerks who can retrieve and display the CRS record and the already scanned flight and audit coupon images on-line through their workstations.

The 20-year-old system being replaced stored only the computerized record of the ticket sale. To audit revenues, employees had to find the hardcopy agency coupons and passenger flight coupons, which were stored in piles seven feet tall and covered an area the size of a basketball court.

Though it is aimed primarily at improving financial accounting processes, the system is multi-departmental in scope.

- Detailed trip-by-trip information on passengers and fares collected by the system allows Northwest to more effectively maintain proper pricing, enforce contracts with travel agents, schedule aircraft, and monitor promotional programs.

- The airline now has far more accurate revenue figures and can close its monthly books in about half the time.

c. Origin and Destination Revenue Management

Airline revenue (or yield) management systems have provided decision support capabilities for pricing determination since deregulation in the late 1970s.

Industry analyst Peter Keen describes airline yield management's aim as ensuring (1) that when a plane takes off it carries the highest profit, (2) that there are no empty seats that could have been sold at another discount, and (3) no seats were filled by passengers who paid a low fare while full-fare travelers were turned away.

Now airlines want to make their revenue management systems even more powerful by increasing the scope of the information upon which pricing decisions are based.

Like revenue accounting, revenue management is in the strictest sense an internal function—in this case aimed at maximizing a carrier's yield. But the interrelationships between carriers required to get travelers to their destinations across the globe must be considered in yield analyses for a complete assessment of a carrier's revenue potential.

Origin and destination (O&D) revenue management is the term often used to describe an emerging extension to yield management theory. In the simplest terms, it can be described as evaluating the value of a seat based on the known demand for that seat, including demand from interlining passengers. O&D revenue management considers the yield implications of accepting or rejecting an interlining passenger, as well as the chances of selling the seat to a non-interlining passenger.

Direct links between CRSs and carriers' reservation and inventory systems will be an important feature in origin and destination revenue management, since real-time seat availability information on multiple carriers is needed to support pricing decisions that take interlining revenue potential into account.

This is the "bleeding edge" of yield management theory; most carriers do leg-based or segment-based yield management at most, but incremental gains (possibly 5-10% revenue enhancement) equate to billions of dollars per year to airlines.

6. Changes to Industrywide Financial Agreements

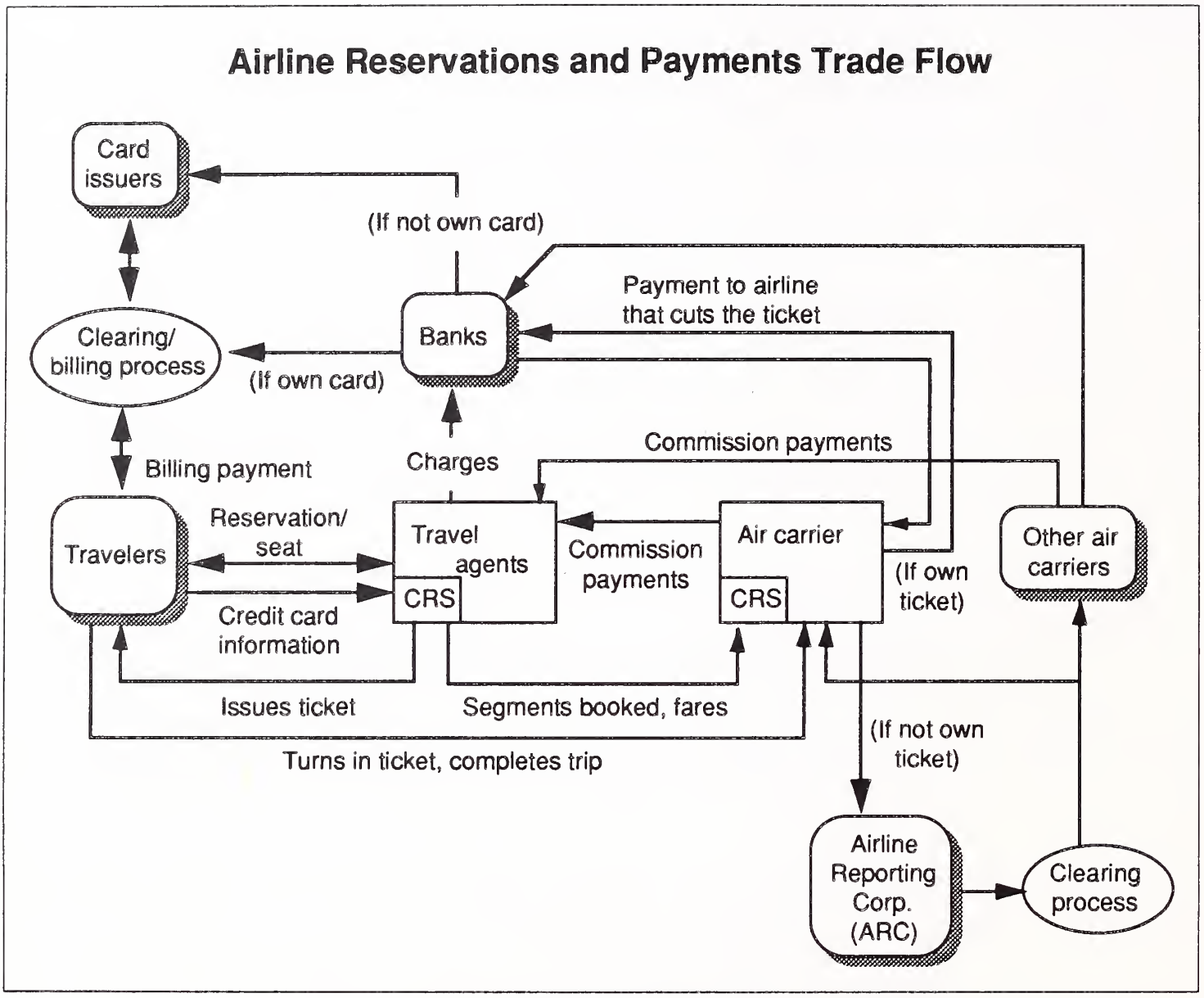
Many carriers believe that the airline industry interlining agreements needs to be updated, because current settlement processes and rules on intercarrier payments favor the owners of the dominant CRSs.

Exhibit VI-6 shows current airline reservations and payment trade flows. (The overall processes depicted in this diagram were reviewed previously, in Chapter III).

An example of bias noted is the cash flow advantage large CRS owners have. The carrier that owns the CRS through which the ticket is cut receives immediate payment from the credit card company for the ticket, regardless of whether the ticket is for one of that carrier's flights. If the ticket is another carrier's, the CRS settlement comes later, via the airlines' financial clearinghouse—ARC is the U.S. clearinghouse.

In addition to this, big CRS owners benefit from interlining rules that require carriers to make up-front CRS payments covering their estimated booking fees. This means that airlines that own the CRSs with the largest market share have access to their $2-3 fee-per-segment-booked on other carriers' flights well before the clearing process allows the outside carriers to receive payment for the flights.

EXHIBIT VI-6



The fact that SABRE and Apollo together have about 70% of U.S. CRS terminal installations indicates that a few airlines (AMR and the Covia Partners) receive most of the advance booking fees, while the remaining seven majors and all the other smaller or regional carriers either lose the use of their money by paying in advance, or do not get their business from CRS bookings. Southwest is the only one of the majors without an interlining agreement, and sells most of its seats directly, not through CRSs.

While specific rule changes are not known by INPUT to be "in the works," these and other such issues are being closely looked at by the carriers adversely impacted.

New rules would mean industrywide re-engineering of airline payment-related transaction flows, and would require changes to clearinghouse systems and carriers' internal revenue accounting or financial systems. And improved cash flow might also reduce the pace of consolidation by giving a boost to the smaller players.

D

Opportunities and Impacts for Users: Non-Air Providers

Exhibit VI-7 lists opportunities and impacts for hotel, car rental and other non-air travel service players.

EXHIBIT VI-7

Opportunities and Impacts for Non-Air Travel Services Providers

- Expanding distribution channels
- Yield management systems
- Community-wide development
- Operating within the airline infrastructure

1. Expanding Distribution Channels

Developments in non-air reservation systems—hotel, rail, car rental, and others—are expanding these sectors' distribution channels to include travel agencies.

Sponsors of these developments (many of which are profiled in Chapter III, Section A of this report) include airline CRS owners seeking to expand their scope, as well as representatives of various travel sectors jointly building reservation systems and linkages to airline CRSs.

These new reservation systems developments are aimed at gaining bookings for their sponsors through expanded access to agency channels.

Travel sectors that stand to gain the most from electronic trading are those that offer highly standardized products, often packaged with airline travel.

Airline seats and perhaps airport rental cars resemble commodity products in many ways—a customer's requirements, unless colored by mileage club loyalties, can be met by a number of companies that provide the desired service at the required time and price.

Hotels, on the other hand, offer far more choices and regional variations. Efforts to adapt CRSs to support hotel selection needs include imaging modules that permit viewing of images of hotel properties, and UltraSwitch Phase II, which will expand the level of detail on hotel properties, service levels, and room availability.

Even with these enhancements, hotels participating in CRS and related development projects are the 17 chains that comprise 85% of the electronically booked hotel rooms in the U.S. Smaller chains, independents, and niche providers whose business is less "commoditized" or not as closely linked to air travel represent a large segment of the lodging business not impacted by these developments.

2. Yield Management Systems

Paralleling community-wide reservation systems developments are improvements in internal reservations and inventory management systems.

Together, these new systems allow non-air players to employ more sophisticated pricing, manage yield better, and collect and analyze customer information for use in marketing planning.

For example, hotels are now moving toward offering discounts for advance bookings similar to airlines' 21-day- and 30-day-in-advance fares, supported by increasingly sophisticated systems.

Amtrak announced in 1991 that it was implementing a yield management system for its passenger rail transportation operations with the assistance of American Airlines Decision Technologies group (ADT).

The system updates historical ridership data every night and highlights important patterns or anomalies. Based on this information, including patterns of no-shows on particular routes, Amtrak will adopt the airline practice of overbooking to ensure that as many seats as possible are filled.

3. Community-Wide Development

Distributed systems and development technologies have advanced in the twenty years since reservation systems first emerged, but the cost and complexity of systems development, and requirements to comply with an increasing level of government regulation, have risen as well.

The idea of going it alone on development projects of the size and scope of reservations and payments applications is one of the past. The airline industry, with its alphabet soup of organizations (ATA, IATA, ARC, BSPs, ASPs, SITA, etc.) aimed at promoting joint standards development and operations, has demonstrated that competitors can also work together in areas where they have common interests.

Non-air travel organizations are developing their own consortia:

- THISCo, whose membership is dominated by member hotels and includes travel agency representation
- INTRICO, a hotel/car rental consortium with system development by an airline's IS subsidiary *[Project was cancelled at press time for this report]*

Community-wide systems initiatives in non-air sectors require continued and additional support from the travel community to finance large-scale development, and to find solutions to common business problems that may be addressed through electronic commerce.

4. Operating Within the Airline Infrastructure

It seems unlikely that another SABRE will emerge among non-air travel players—even SABRE itself has a different story today than the old myth of SABRE the money machine.

Non-air sectors stand to benefit from improved access to travel agency bookings, but the presence of the electronic trade infrastructure established by airline CRSs means their efforts will be strongly influenced, if not driven in many cases, by airlines.

Airlines possess the technical expertise in developing, implementing, and maintaining large-scale network applications, as well as the strategic motivation to expand their reservation systems to include more extensive non-air offerings.

Emerging are not new SABREs, but extensions to the SABREs and Apollos of the world—if not direct extensions to the original systems, then line extension into non-air travel information systems which broaden CRS product offerings and bring in new revenue.

Airlines and travel agents are interested in the concept of "seamless travel," perhaps implemented through the automated ticket and boarding pass (ATB), used to record all trip details from flight seats to hotel rooms, rental cars, and other service arrangements.

While seamless travel services delivered in such a form are possibilities for the future, current developments have airlines playing a key role in emerging non-air systems.

AMR and Covia, for example, have developed hotel and car components of SABRE and Apollo, but have significant interests in non-air travel systems beyond the CRS.

- AMR's information services subsidiary, AMRIS, is the systems integrator for the INTRICO system, and will likely become the outsourcer responsible for operating the system when it is released in 1993.

- Other AMR initiatives include RESARAIL 2000, the reservation system jointly sponsored by the French National Railroad and a division of AMRIS, and SABRE's Integrated Tours System, designed to effectively make SABRE a wholesaler for certain destinations.

- Covia has a two-year-old hotel CRS joint venture with Loews Hotels, called C/LAS, an internal hotel property management system called Covia Reserve, and has also expressed interest in UltraSwitch's Phase II, the system developed by a consortium of 17 hotel chains.

- The THISCo initiatives—the HCC CA$H Clearinghouse and UltraSwitch direct links between hotel reservation systems and airline CRSs—remain the only major examples of non-air EC systems development in which airlines or their systems subsidiaries do not have a sponsoring role.

It will be some time before the dust settles on these ventures and those with reach and staying power emerge. Nevertheless, it is clear that many of these initiatives can be viewed as much in terms of their importance to airlines as to non-air travel players.

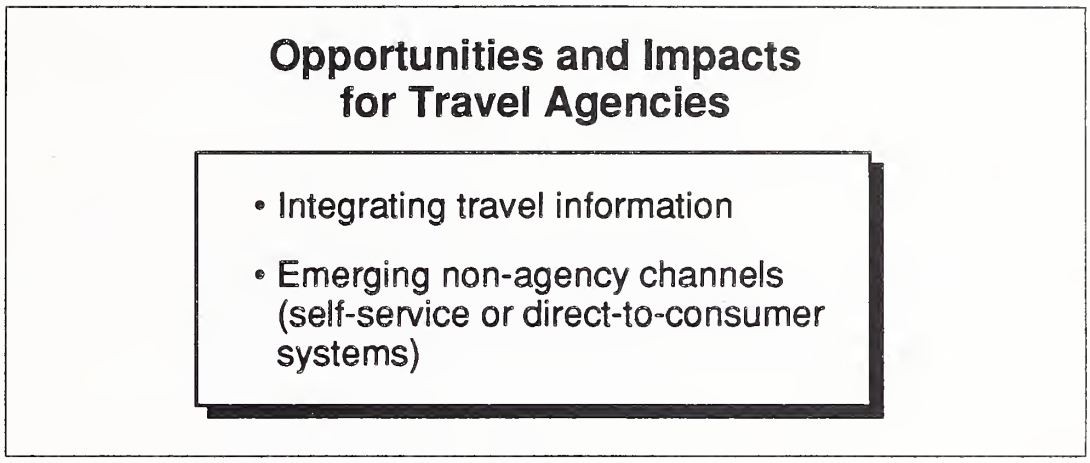
The challenge for hotels, car rental, rail, and tour operators is to work effectively within the airline infrastructure and take advantage of available resources, but at the same time guard their own business interests and develop standards, organizations, and business practices to support these interests.

E

Opportunities and Impacts for Users: Travel Agencies

Exhibit VI-8 shows opportunities for travel agencies.

EXHIBIT VI-8



1. Integrating Travel Information

Since the late 1970s, travel agencies have operated using CRSs developed by airlines as their primary IT resource. Now, agencies are beginning to assume a stronger role in integrating multiple information sources to provide service tailored to their customers' interests.

A growing number of choices in travel systems software and a soft travel market are driving forces behind the trend for agencies to focus on getting better use of information systems in an effort to improve their services.

Case studies of two different types of agencies that are integrating travel information using in-house and third-party systems follow. One is a large corporate travel agency; the other serves the personal or vacation traveler.

a. Corporate Agency Case Study: Rosenbluth Travel

Rosenbluth Travel, a Philadelphia-based corporate travel agency, has grown from a $120 million regional firm in 1980 to a player with international status today, earning $1.3 billion in 1990.

The agency's IS staff of 80 supports over 2,600 employees in more than 530 U.S. locations, and is viewed by Rosenbluth's management as critical to the success of the company and key to future growth.

Rosenbluth was one of the first agencies to develop in-house reservations systems that add to the functionality provided by airline CRSs.

Beginning in the early 1980s, the agency guaranteed its corporate customers the lowest fares, and used in-house-developed networked reservations applications and data bases to support this guarantee.

In response to agency needs, airline CRS vendors have also added agency front- and back-office functions to their systems, increasing them as competition between vendors heated up in the late 1980s.

Key components of Rosenbluth's custom in-house systems include:

- Precision, the agency's proprietary data base, lists in descending order of price all fares for a given period of time between specified city pairs. This price listing is not available from any airline CRS.

- A quality control system verifies all bookings made by agents. It checks against a master customer data base to verify the accuracy of the passenger record and make sure preferences were honored. It also double checks the fare data base for lower fares that might have been missed or become available since initial booking.

- Vision, the back-end system, collects and digests customers' travel patterns and expenses and produces custom reports that identify opportunities for savings. One client learned from reports that 70% of its travel was between only 13 cities, and used this to negotiate volume discounts on airfares and hotels for these locations.

- E-Res, an electronic link between the agency and its corporate customers, allows clients to submit travel requests by E-mail and is being offered as of this writing (profiled in Chapter IV, Section B).

Hal Rosenbluth, CEO of the agency, envisions his firm one day using information technology to move into a true information services role, serving corporate travel departments that want to outsource their corporate travel and entertainment (T&E) expense management function. This is a market already dominated by American Express, and one that a number of other travel services firms are going after.

Rosenbluth has made some ventures into the services business in the style of AMRIS, however. It provides data entry services from a facility in Clinton (ND), and has begun to offer training seminars on leadership skills and telephone techniques.

While significantly larger and more IS intensive than the average travel agency, Rosenbluth's example shows the potential for value-added information systems development in agencies.

Its forays into information services show that electronic trading systems and information services by-products need not come only from the airline sector.

b. Consumer-Oriented Agency Case Study: California State Automobile Association

The California State Automobile Association (CSAA), a regional organization of the American Automobile Association (AAA), recently undertook a broad re-engineering effort aimed at improving the efficiency of its operations and re-establishing the close relationship with its members that it had when the association was much smaller.

Information on the CSAA initiatives was provided to INPUT by CSC Index, the professional services firm engaged by CSAA for the re-engineering project.

CSAA views this work as strategic and confidential, but approved publication of the overview information that follows. These highlights are extracted from CSC's client publication, *CSC Insights* (Spring 1992).

CSAA is one of the largest AAA organizations in the U.S., and provides a broad array of travel-related and other services, including tour books and emergency road service, airline ticketing, auto and home owners' insurance, car rentals, and travelers' checks.

Though its origins were in assisting automobile owners and road travelers, AAA provides travel services like those of an agency, but is also heavily involved in the insurance business. It considers itself one of America's largest diversified financial companies.

CSAA has $3.2 billion in assets and employs 5,700 people in 72 district offices throughout its territory of Northern California and Nevada.

At the time of this publication and through the end of 1993, pilot systems and new business processes are being tested at CSAA district offices. After modifications resulting from this "green field" testing, final implementation is scheduled for 1993 through 1995.

Re-engineering efforts are focused on the customer service area. The "member services consultant" is a new position, created when it was recognized that as the organization had grown and diversified, services had become very segmented. A member calling or visiting a CSAA office had to go to one representative at a service window for road maps, another for travelers' checks, another to renew his or her registration, and to others for other services.

Service consultants being trained will be capable of handling 80% of a member's needs, whether they need to make an insurance claim or rent a car. Specialists will handle the remaining 20% of calls.

An information system being designed to support member services consultants integrates data that is now stored in three separate systems. The purpose of the system is to allow the service consultant to respond immediately to a member, whether the response requires answering questions involving insurance policy terms, or giving directions to AAA-approved hotels in Manhattan.

CSAA sees this function as being important in re-establishing the organization's proactive planning role with its members, particularly in the travel area, and in diversifying employees' activities.

With segmented services, some representatives spent all of their time processing automobile claims and dealing with stressed or upset clients, and employee burnout is common. Service consultants look forward to also assisting in planning members' honeymoons in Hawaii and family road trips and vacations. CSAA hopes that workplace efficiencies will arise from this happier workplace.

Besides the information system used by member service consultants, CSAA is designing other network applications:

- Self-service kiosks that accept CSAA membership cards will dispense tour books and maps.

- CSAA's auto repair services through approved facilities are being more tightly integrated, similar to linkages within a health maintenance organization. A network of AAA-sanctioned repair shops will be linked electronically to the service consultants' system. Service consultants will be able to quickly arrange appointments with approved shops in response to calls from members whose cars need repair. Service consultants can also arrange for a rental car if needed.

c. Conclusions: CSAA and Rosenbluth

The CSAA and Rosenbluth cases demonstrate the potential for large travel agencies, especially those with specialized or extended client services, to use information systems development to improve customer service and add value to basic CRS capabilities.

All the systems discussed in these cases are unique applications of electronic commerce in a travel agency/travel arrangement setting:

- Rosenbluth's adaptation of CRS information in its own reservation system, with enhanced fare checking and bookings based on client preferences

- E-Res, Rosenbluth's E-mail travel request connection with its clients

- CSAA's integrated member service consultant information system, combining travel information, airline bookings, travelers' checks, car rentals, and insurance and auto repair services

- CSAA ATM-style kiosks for distribution of maps and tour books

- CSAA's network of repair shops is in effect an electronic link between suppliers (the shops) and customers (AAA members), with CSAA as the intermediary and system administrator.

Through the 1990s, we can expect to see large agencies building integrated network applications such as these to support their specific market niches and strategic directions.

2. Emerging Non-Agency Channels

One of the end results of electronic trading can be the elimination of intermediaries. Agents and tour operators, as the primary intermediary groups in the travel value chain, should be aware of potential impacts from restructuring of transaction flows arising from electronic commerce.

The travel sector has been somewhat unique in this regard, because the intermediaries or "middle men" have, in most cases to date, been the recipients of electronic commerce technology, rather than being eliminated by electronic commerce trade flows.

Nevertheless, the emergence of consumer channels that bypass travel arrangement services, or "pre-packaged" tour options that bypass tour wholesalers represent the sorts of threats to intermediaries that should be monitored.

Elimination of intermediaries as a result of EDI and other electronic network systems is occurring in other industries, such as grocery distribution, pharmaceutical distribution, subscription agency services and custom brokering services.

CRSs are changing under economic and regulatory pressures. A number of emerging technologies may steer some agency business away to direct-to-customer or self-service channels.

These include:

Self-Service Ticketing

Initial plans for ticket-dispensing kiosks presume that travelers will still use an agent to make travel arrangements, with the kiosk providing 24-hour availability and convenient locations for ticket pick-up.

But if kiosks grow in scope and functionality as some predict, the kiosk could let travelers choose from schedule and price options, eliminating the need for an agent when choices are fairly straightforward.

Personal On-Line Services and Travel Planning Software

The availability of the major CRSs on on-line services such as Prodigy and CompuServe, plus the increasing number of consumer-oriented travel planning products, are making it easier for individuals to do more of their travel planning without the services of an agent.

The Official Airline Guide (OAG) on disk, and various automated trip and vacation planners on magnetic disk or CD ROM, are now widely available in the $25 to $200 price range.

CRS vendors offering simplified versions of their systems for home users say these users constitute a very small portion of their business, but individual agencies will be impacted to a greater degree.

Agencies whose client base is heavy on computer-literate personal travelers likely to take on more travel planning, given the appropriate tools, need to consider where they can best position themselves to add value in the future.

Packaged Tour Systems

Travel agents have been lucky to come out with positive gains to their business from electronic commerce, despite emerging technologies that may erode personal travel arrangement services.

Tour operators are also seeing some of their niches disappear, as a result of packaged tour systems being developed by airline CRSs and placed in travel agencies.

SABRE has gone so far as to develop its Integrated Tours System, known to the public as Fly Away Vacation. (Apollo is developing a similar product, named LeisureShopper, due out at the end of the third quarter 1992).

The idea behind SABRE's Integrated Tours System was to save some of the negotiated commission rates (often under 10%) that American pays to wholesale tour operators who buy blocks of seats at cut rates. American also wanted to expand into the packaged tour business, targeting unique destinations that did not represent competition to its established tour operator partners.

The architecture and software used for the Integrated Tours System was described earlier in this chapter (Section B-1). Rolled out in 1989, and planned to handle up to 30 different tour packages, the system debuted with a Las Vegas package, followed shortly thereafter by Club Med vacations.

The system grossed $12.5 million in its first quarter of operations (January to March 1989), and booked 50,000 passengers. American estimated its savings in tour operator commissions at around $12 million for the first year.

a. Conclusions: Elimination of Intermediaries

If technology can eliminate intermediaries, or at least present risks to their businesses, strategic thinking and continuous monitoring of the technical/ competitive environment is absolutely required of executives in electronic commerce market environments.

Faxon, a subscription agency threatened by the restructuring of library-publisher communication and trade channels, has defined its strategy expansively enough to allow for the company to exist even if electronic communications and delivery of text materials eventually eliminate every function that the company now performs.

The company's objective is to play a role in the information exchange between users and creators of knowledge. Whatever new technical possibilities emerge, this company plans to take on a role in the resulting information services market, and continue offering services to its current customers, even if the nature of those services is largely transformed.

When the CEO of Rosenbluth Travel makes the statement, "Our core business is information services," he displays a strategic orientation similar to that of the president of Faxon.

Rosenbluth's sights are on T&E outsourcing, but the agency's emphasis on becoming technologically self sufficient and using EC systems to add value to typical agency services gives it a hook into the electronic commerce marketplace that can become the basis for new business opportunities in information services.

Harnessing technology to survive market shifts resulting from electronic commerce is not the answer for every company. Some Rosenbluth customers worry that overemphasis on systems and technology will detract from Rosenbluth's core business.

It is dangerous to ignore the power of information technology, but the solution is to understand its potential impacts, and develop appropriate strategic responses. For example:

- In-house systems that add value may be appropriate for agencies with the resources to develop them, and the systems can act as a differentiating factor in those agencies' market niche.

- Tour operators whose offerings make them candidates for alliances with airlines stand a better chance of surviving the "pre-packaged package" route offered by airline tour systems.

- A travel agent interviewed by INPUT sees possibilities in developing a network-based travel service based on exchange of unusable tickets.

Travel intermediaries must continue to monitor potential impacts of technology, assess their own operations and what they do well, and plan to change their businesses to protect them from the sweep of electronic commerce.

F

Opportunities for Electronic Commerce Service Providers

Many of the impacts on business practices described throughout this chapter are driving and reinforcing opportunities for providers of electronic commerce systems.

With the fine line between user and vendor in a market such as this, where penetration of electronic commerce is extensive, many users have already assumed vendor, or vendor-like roles.

Business opportunities for users include sponsorship, development, and delivery of services related to community-wide applications such as CRSs and related systems.

Exhibit VI-9 lists some key opportunities for vendors whose core business is information services.

EXHIBIT VI-9

EC Vendor Opportunities in Travel and Tourism

- Reservation systems (air and non-air)
  - Re-architecting systems
  - Integrating and globalizing systems
- Multiple CRS access and third-party software
- Outsourcing of community-wide systems operations
- Financial systems and customer service applications
- Greater EDI penetration

1. Reservation Systems

a. Re-Architecting Systems

The trend toward distributing and re-architecting CRS functions is creating opportunities for systems development services.

CRS vendors have large development staffs and possess a great deal of expertise in large-scale, centralized mainframe systems development and networking, but have had to develop new skills in client/server and workstation computing, LANs, and downsizing applications. Opportunities for deployment of specialized skills and knowledge exist as a result.

b. Integrating and Globalizing Systems

CRS mergers and the move to globalize the systems means that significant work must be done to integrate previously independent, regionally focused systems.

The mergers and alliances typically take place on paper long before steps are taken to make the technical changes required to build direct links between CRSs and participating carriers' systems.

A true CRS merger may require a total rewrite and a new "merged" system, as in Worldspan's new system, due out in 1993.

Worldspan—the business entity—was created in 1990, as a result of the merger of the TWA and Northwest system (PARS), and Delta's system (DATAS II). But the new Worldspan system has been a major, three-year-plus undertaking.

Another example of a major CRS undertaking, this time impacted by the globalization trend, has been the development of the AMADEUS system. A joint venture of Air France, Lufthansa, and SAS, development was started in 1987, and the system began operations in 1992.

Andersen Consulting's role in developing carrier and travel agency support systems for AMADEUS demonstrates that large services opportunities may arise out of peripheral functions required in CRS development. Andersen's ability to develop common global functionality and provide European personnel for localized training, support, and implementation on a broad geographic scale was key to the roll-out of AMADEUS.

CRSs that are undergoing large-scale changes, or whose ownership is by consortium and a permanent support staff is still being formed, would appear to present opportunities for systems development and other professional services.

These opportunities also apply to non-air developments, many of which are sponsored by consortia.

- The two THISCo projects—HCC/CA$H and UltraSwitch—were contracted out to two different vendors.

- The CA$H system was jointly developed with AT&T American Transtech, and UltraSwitch with Anasazi, a Phoenix-based services firm.

2. Multiple CRS Access and Third-Party Agency Software

Both the regulatory and the competitive environment are creating opportunities for systems and software products to work in conjunction with CRSs or add to the systems' capabilities.

Vendors already developing agency-specific products know that DOT is likely to issue regulations that will make it easier for agencies to subscribe to more than one CRS. Many have developed third-party applications that may be used to access and process reservation information from multiple sources (discussed in Chapter IV, Section B-2).

Travel arrangement providers developing value-added reservation systems also present opportunities for consulting or development services (CSAA was assisted by CSC/Index in its re-engineering project).

The emergence of the travel agency as an active participant in electronic commerce development (stepping beyond its role as primary user) is a significant change. Agencies are being pushed to become more IT savvy.

3. Outsourcing of Community-Wide Systems Operations

As CRSs and other electronic trading systems have made the transition from proprietary, single-source systems to community-wide channels, outsourcing opportunities have begun to arise.

Financial issues and the need for CRS owners to focus on their core airline business certainly provide incentive for outsourcing, as evidenced by the EDS/System One agreement (a $2.1 billion, 10-year contract).

INPUT suggests that the nature of community-wide systems also makes outsourcing a compelling option. In jointly owned systems, the answer to who should be responsible for the ongoing care and feeding of the system is not necessarily "the owner." Which owner?

THISCo's development of UltraSwitch illustrates this.

a. Outsourcing of Jointly Sponsored Systems: UltraSwitch

UltraSwitch is owned by 17 hotel chains and a travel agency trade magazine. Each has its own information systems to support, and none have the IT clout of American Airlines.

Anasazi, a contract services firm, was engaged at the start of the UltraSwitch project to provide development and project management assistance in the building of the system. Development (Phase II is in process) is on an Anasazi mainframe at Anasazi's data center in Phoenix.

The development staff consists of both THISCo (the consortium/owners of the system) IS staff and Anasazi personnel. Once major development and testing is complete, Anasazi will take on responsibility for system operations and maintenance, and THISCo will scale down its technical staffing.

A THISCo development manager interviewed by INPUT commented on the outsourcing opportunity presented by UltraSwitch, noting that Anasazi had grown from a general contract house to a more mature and focused firm in the four years since development began. In addition to UltraSwitch development, the firm has developed its own proprietary hotel management system and has established a presence in the lodging and hospitality sector.

b. Outsourcing Conclusions

AMRIS has also been active in development of community-wide systems such as INTRICO's CONFIRM RS and RESARAIL 2000 in Europe. Whether these contracts include systems operations is not certain, although AMRIS acts as a sponsor and will benefit from ongoing revenues from these systems.

What is clear is that there are potential opportunities in operations of community-wide systems. Services firms that have or can develop travel industry expertise should consider outsourcing of CRSs or related systems.

4. Financial Systems and Customer Service Applications

The importance of financial systems improvements and new customer service applications in the airline industry were discussed in some detail earlier in this chapter (Sections B-4 and B-5).

Systems development opportunities exist in both of these areas. Andersen Consulting's revenue accounting practice and Speedwing's mobile communications initiatives are but two examples of vendors active in financial and customer service systems.

5. Greater EDI Penetration

EDI is used extensively in the airline sector of the travel community, although electronic commerce is primarily a product of real-time messages sent between network applications such as CRSs, not EDI transactions.

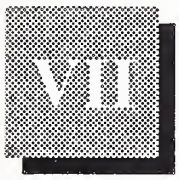
Interactive EDI standards now in development are aimed at producing real-time messages that support the reservations process for all travel sectors—air, rail, hotel, car, ferry—and are being designed to support international business requirements.

Broad acceptance of these standards across the travel community should promote sales of EDI software, but development of standards of such ambitious scope takes time. The first pilot standards are due to be reviewed within EDIFACT later this year. Widespread acceptance and implementation of systems using these standards is some two or more years off.

At airlines, EDI has a longer history, and airline-specific interactive EDI is in use. EDI applications that should continue to grow include the following. The first two systems use interactive EDI messages.

- Departure control systems (DCS) transactions
- Airline passport information transmitted ahead of international flights to speed up customs clearance
- AVNET (petroleum supplier-to-airlines connection)
- SPEC2000—the parts supplier link first developed in the 1950s

EDI suppliers can expect to continue developing new business with airlines, but should consider longer term opportunities in other travel businesses, especially as air and non-air systems continue to converge.



Conclusions

Commerce among members of the travel and tourism trading community is highly automated, much more so than in any other community studied by INPUT to date. Classified as a vertical market, travel and tourism electronic commerce is a $3.6 billion market.

Electronic commerce is most extensive in the airline sector, but is moving into additional sectors, especially service areas that are highly standardized and services closely linked to air travel.

The long-term economic impacts of conducting business via electronic trading systems are now emerging.

In the 16 years since they came on the scene, CRSs and other network applications have streamlined the process of buying and selling airline tickets and have made it easier for consumers to evaluate competing carriers' schedules, prices, and services.

Now the airline industry is showing signs of economic strain (recent trade press reports estimated industrywide losses over the past two years at $6 billion). Can electronic commerce be contributing to the problems in the industry? Is the completeness of CRS information and the marketplace efficiency provided by CRSs making it difficult for airlines to compete?

Or are the industry's current problems just the visible outcomes of a natural process of consolidation forced by the deregulation of the late 1970s?

Robert Crandall's comment on the likelihood of carriers being forced into bankruptcy as casualties of recent fare wars reflects this notion. Crandall stated that the market must be allowed to "finish the painful process of eliminating surplus capacity."

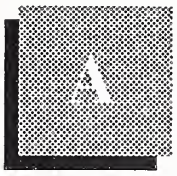
Whatever the final economic analysis, INPUT suggests that electronic commerce is a key factor in the competitive environment for airlines. The maturing of electronic trade (which is approaching the end of its second decade in the airline sector) presents some unique challenges. These challenges include:

- Making the transition from proprietary to open systems
- Updating and distributing centralized, 1970s-era mainframe applications
- Managing the costs of CRS development, operations, maintenance, and enhancements

The travel and tourism community as a whole can expect the following broad developments over the next decade:

- Consolidation among CRSs: more mergers, alliances, and an overall reduction in the number of major regionally focused worldwide players, from more than ten to no more than five globally oriented systems
- Non-air electronic commerce will establish its own identity, growing out of the various consortia and new initiatives detailed throughout this report. In time, the distinction between airline-oriented and non-air systems will fade or disappear altogether.

The market that forced CRSs to move beyond their origins as single-source or biased airline sales channels to relatively unbiased electronic airline markets is already demanding an expansion of these markets to offer full-service travel shopping.



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