The Internet has started to revolutionise airline revenues thorough reducing distribution and marketing costs, simplifying fare structures and extending reach to more potential passengers. Some airlines have overlooked the effects of revenue dilution and IT infrastructure requirements.

Reaping the benefits of E-commerce

Airlines have developed a keen interest in e-commerce. The Internet can make many existing systems and processes redundant, while capturing more passengers if airlines use the technology intelligently, but this can require expensive trial and error.

Most airlines now have e-commerce systems in place, ranging from Internet booking to integrated suites of systems that anticipate and manage passengers' needs. This article focuses on the aspects of the sale and management of passenger tickets, and the risks and rewards to be expected by airlines seeking to implement or optimise an e-commerce strategy.

Internet sales

Installing a booking engine onto an airline's internet site is far from easy. Many problems must be overcome before the system can be rolled out, and airlines need to review their entire revenue management (RM) and pricing policy to be sure they can offer Internet booking.

Internet booking requires a 'yes' or 'no' decision process. When a customer places a request for travel, the airline's response must either be 'yes, there is a seat' and state the fare options available, or 'no there are no seats available'. This removes airlines' ability to waitlist passengers, as currently happens through a travel agent. Waitlisting allows an airline to keep passengers in reserve in case other passengers cancel from a flight before it departs, reducing the risk of unsold seats without resorting to overbooking. As a passenger cancels its reservation, a waitlisted passenger is confirmed in its place. British Airways estimates it sells each seat up to seven times before any flight departs. With Internet booking, the airline must either accept or reject a booking at time of placement. This process alone requires a huge alteration of the RM principles that airlines use.

RM must now either carefully forecast demand and ensure that a flight is never full, or deny Internet sales.

The objective of RM is to ensure flights are optimised, which involves balancing the supply of available seats in each fare class with demand for each fare class. Traditionally this is examined each night during the sale period prior to a flight. If the expected bookings have materialised cheaper fares are restricted or removed from sale. If sales have not materialised lower fares are made available.

Airlines using Internet booking engines can no longer wait until 22:00 each night (when most RM programmes start) to forecast and optimise their inventory for the next day's sale. Information must be constantly updated.

Some airlines are developing systems that re-optimise the available fares after each booking is made to ensure that the flight is being sold to its highest possible mix of fares, or 'yield mix'.

One negative effect of Internet booking is that it has increased the volume of seats dumped at low rates. Internet sites like lastminute.com or travelocity, as well as an airline's own site offering last-minute travel deals, do, however, generate less revenue because fares are dumped, rather than sold earlier at higher rates. Passengers do not

The benefits of selling through the Internet are reduced costs of distribution and travel agents commissions. Airlines often overlook the technical difficulties of interfacing the Internet with their existing systems. Fares also have to be simplified, with smaller increases between fare classes and the removal of restrictions, with the result of lower revenues.

purchase seats earlier because they are aware of last minute deals. Airlines will hold out for higher-priced fares close to departure, only dumping them if predicted demand fails to materialise. The level of discount required on a fare is significant: between 30% and 70%.

"Airlines often keep fares high until close to travel, and then discount at a late stage only when absolutely necessary," says Steve Hendrickson, partner at Sabre Airline Solutions' Airline Consulting Services. "As a result, the main way to sell distressed inventory is by dumping fares through the Internet.

"While the number of higher-paying passengers securing cheap tickets this way may not be significant, discretionary travellers could have been better targeted by the airline initially. By poor targeting, the airline has got the passenger on the plane for less money than they might have paid," continues Hendrickson. "The counter argument is that any revenue is better than no revenue, but its weakness is that it does not address the airline's major objective of selling the seat without significant discounting. Using a frequent-flier database, for example, to target travellers with economic fares would be an example of a well-thought-out strategy, rather than just relying on reducing prices to fill seats at any cost."

Distribution

Airlines have embraced the idea of direct selling, which bypasses travel agents, and gains significant savings by avoiding commissions and reservation fees. "Direct sales certainly reduce airlines costs," says Hendrickson. "However, in

the drive to push the passenger to Internet booking, airlines often forget to consider their revenues. The discounts they offer are often greater than the commissions they would be paying an agent, so the net result is that airlines are diluting their revenue streams. Airlines need to compare the net revenue of a ticket sold on the Internet with the net revenue for a seat sold at a travel agent. Many airlines do not do this, and instead compare the cost of sale which favours the Internet. This risks eroding revenue levels by selling more via the Internet."

If used properly, the Internet can be a powerful distribution tool, providing airlines with greater reach to customers than previously possible. Ryanair launched its website in 1997, and within eight months Internet sales accounted for over 65% of sales. The Internet accounted for 95% of sales by 2003.

"Control of our distribution channels is vital to our business strategy," says Tim Claydon, senior vice president of sales and development for jetBlue. "Unlike many carriers, which are trying to claw back distribution control, we have controlled it from the start. We are hosted in the Sabre system, but only 2% of our bookings come from that source. We are primarily there for corporate booking, and the display is limited because we pay very little for the service. The Internet is our biggest booking method, and we are always looking at ways of increasing its functionality."

While Internet distribution enables airlines to secure cheaper methods of revenue generation, it also presents problems. Internet access makes fares available on a 24-hour basis, and

removes airlines' ability to review the day's selling pattern each evening when the revenue management system re-forecasts. Internet distribution policies must be refined to reflect the new operating conditions that airlines face, with required changes in pricing, revenue management and other areas to ensure maximum efficiency.

Fare pricing

Pricing, distribution and Internet strategy are now closely linked. Fare structures must be simplified and allow different fares to be combined to complete a passenger itinerary. Volare Airlines, based in Italy, required significant changes to its fare structure when it migrated from an established distribution system via travel agents to one that was primarily Internet driven.

"We had to review our entire fare structure prior to launching online booking," says Lucio Graziani, IT Manager of the Volare Group. "While part of the review was influenced by our move to a low-cost strategy, most of the change was driven by the demands the Internet placed on us. One critical area is to reduce the price gaps between each fare so fares did not discourage passengers. A lot of our earlier pricing was driven by advanced purchase (APEX) rules, which prevented most APEX fares being combined. Internet pricing requires a far more efficient and simplified pricing method. Fares must be combinable, and increments in fare levels must be small and most rules removed."

Some of these issues can be overlooked, especially when an airline

first embarks on Internet-based selling. When airlines retain excessive rules, the system slows down because the booking engine has to satisfy the fare rules, and may not present options agreeable to the user. For a site to be user-friendly, the overall pricing policies need to be simplified and streamlined. Many airlines miss this area and it can severely limit their selling potential. British Airways redesigned its Internet site together with a move to more flexible pricing. Its site now offers flexible pricing and a system that displays the cheapest available prices.

Pricing options and rules governing fare validity are often very intricate, because they are designed to impose restrictions to encourage purchase of higher fares. "Restrictions and ticket prices are generally inversely correlated; so as price increases rules decrease, and vice-versa," explains Graziani. "While that worked for network carriers seeking to minimise the volume of low-revenue passengers accessing flights at busy periods, it is less applicable now because of the number of low cost carriers which do not apply these restrictions.

"Internet transparency allows the passenger to compare options and they book quickly. Passengers do not think about it for a week or two because they know the fare will go," continues Graziani. "The benefit of this is that sales are quick and volumes are high. Another benefit of cheaper fares is that passengers are more willing to no-show and not seek a refund, as the hassle of gaining a refund is greater than the revenue value. Providing no-show calculations are accurate, and we do not lose revenue through full flights departing with spare seats, the benefit of no-show revenue is significant."

Revenue management

RM processes must be adjusted to cater for Internet selling. With the removal or limitation of fare rules, airlines no longer have a protection mechanism to force passengers to buy a higher fare, higher fares generally have few or no rules. The removal of rules and ticket restrictions means passengers can secure cheap fares if the airline does not frequently monitor its flights.

British Midland, in collaboration with Sabre, is altering the forecasting logic of its Airmax system to address the issues that arose when it changed its pricing structure. "Revenue Management has traditionally been based on a returning passenger structure," says Alan James, senior manager of network planning and revenue management with British Midland. "We have had to change that structure, because our pricing policies have altered. All our fares are now combinable, and no longer have APEX restrictions. This means that fare rules no longer protect us from opportunistic reservations.

"Previously, if a passenger booked a seat in a low fare class with a 21-day APEX rule and tried to get the ticket issued 20 days or less before travel, it would be refused. This protection is now removed with the new price structures, and we are reliant on RM forecasting to control available fares. Having to adjust the RM system to reflect this change was not easy, and we have been working closely with the system vendor to develop an upgraded version that can cater for our new pricing environment," says James.

Forecasting demand can be difficult, especially as more people are able to

access the airline's fares on a global basis. During its first seat sale BMI baby sold its entire allocation of seats in the first two days; the sale was expected to last about eight days.

"When you use the Internet you really broaden your customer base," says Hendrickson. "While this sounds elementary, it is often overlooked or ignored. Airlines often fail to grasp the number of people who wish to book online, and suffer the consequences when their resources fail to deliver. Insufficient seats available, restricted server capability and poorly designed websites are common mistakes. Airlines also allocate excessive inventory in lower fare classes, eroding their revenue potential on a flight. That generally happens because airlines underestimate the catchment size of Internet sales and do not use their RM tools to limit the number of highly discounted fares quickly enough as a response to the high demand.

The technology is available for airlines to optimise available fare classes on flights repeatedly throughout the day. With 24-hour Internet access this is now an important area. The accepted principle of optimising all flights between 22:00 and 05:00 in preparation for the next day's selling is now approaching obsolescence. This was primarily done because of the scale and complexity of forecasting demand in every fare class for every flight for a year in advance, which is what RM does. Forecasting is now being done multiple times during the day, to better better manage flight demand.

Internet reservations

The Central Reservation Systems (CRSs) used by airlines have changed little since they were designed in the 1970s. Due to their obsolete architecture, most CRSs struggle to interface with Internet Protocol (IP) enabled systems. This is visible in availability displays, where airlines can struggle to sell all seats available because of their ageing system technology.

CRSs communicate with Global Distribution Systems (GDSs) by using either dynamic or availability status (AVS) messaging. Messaging systems

inform the GDS of the fare classes available for each airline's flights. Errors often occur if an airline does not use dynamic availability and instead relies on AVS.

Dynamic availability updates displays as soon as a reservation is made, while AVS relies on messaging to update displays, resulting in a delayed response. AVS can instruct the GDS to display available seats that no longer exist, or display no seats available when in fact there are some: if less than five seats are available the class may be shown as closed so no more bookings can be made, despite seats actually being available. If five or more seats are available the system will often show the class open for sale with nine seats, since this is its default setting, resulting in class overbooking.

The use of AVS is driven by many disparate systems whose ageing software means they are unable to communicate with each other any other way. To combat this, companies are beginning to invest in Internet-based methods to replace their existing CRSs. "The OpenSkies system we implemented at Volare has worked very well," says Graziani. "As we migrated our flights onto this platform we found that we could benefit from its open architecture design. The drawback with older CRSs is their inflexibility in interfacing with emergent software and booking solutions, and the need to develop ever more sophisticated 'patches' to bypass this issue. Newer systems are more flexible and allow airlines to really push their Internet policies."

SITA has launched a new generation system that is Internet-enabled. Other developers are expected to follow suit. SITA's system allows airlines to transfer most of their reservation procedures to Internet transactions. This moves CRSs closer to pure Internet systems, where the customer controls its own service requirements.

Airlines currently spend large sums on developing Customer Relationship Management (CRM) systems that anticipate customer needs, from seating and meal preference to check-in formalities. Internet systems would allow the traveller to select their own seat from a dynamic seating display, and specify the newspaper, meal and drink they want. This interactive approach is seen by several software developers as the bridging step between the sophisticated but intricate CRSs of full-service airlines and the more basic approach of low-cost carriers (LCCs).

Full service airlines use their CRS and CRM systems to track customer requirements and provide a high level of service from reservation to flight that LCCs do not. LCCs' reservation systems store the passenger name for validation during check-in, but beyond holding the reservation and issuing a boarding pass when the passenger has checked in, they perform few other functions.

E-commerce intent

The primary role that e-commerce plays, and a key area of its popularity, is the extended market catchment it gives an airline. Nearly 25% of the bookings received by Australia's Virgin Blue, for example, are from offshore enquiries.

While market reach is an important part of e-commerce strategy, airlines must be careful to avoid adding cost to their systems. Most booking engines deposit cookies, small files with information about the user, onto the user's PC. When a user accesses the site again, the cookie tells the web-browser which region or language to display.

One airline, to avoid people deleting cookies, invested over $120 million to develop technology that remembered each user's IP address (their individual user address), so that when they logged back in, the system would recognise the IP address and display the users previous settings; essentially reverse cookies.

While this idea is good from a customer service standpoint, the airline had invested significant amounts just so that people would not have to select their language option again. This is an example of an Internet strategy that has gone wrong. "E-commerce is all about streamlining existing revenue streams, and less about finding new ones," says Claydon. "Essentially you need to apply the existing revenue generation areas that airlines have, and leverage the effect of lower overheads to reduce the disparity between gross and net revenue. The Internet is all about lower distribution costs, so you keep more of the money that is booked. This allows airlines to recycle part of those savings to the customer by offering lower, Internet-only, fares. Primarily the role of e-commerce is to generate revenue at greater efficiency rates than are currently achieved. Airlines need to focus on the best way to do that and less on investing in novelty technology that may be rejected by the public, like WAP was several years ago."

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The Internet can be used both to develop potential revenue streams and save in the costs of distribution and marketing. New systems also have more sophisticated auditing and revenue accounting capabilities.

The current environment encourages airlines to seek cheaper methods of distribution, because this is a significant cost centre. LCCs enjoy a significant advantage over their full-service rivals in this area, which was previously investigated by Aircraft Commerce *(see The difference in unit cost performance of low-cost & major airlines, Aircraft Commerce, August/September 2003, page 12)*. The example given was that a carrier like Ryanair would pay about 30 cents per passenger boarded, while a carrier like British Midland would pay $4-5.

E-commerce allows airlines to reduce the ratio disparity. Ratio disparity measures the airline's cost relative to its revenue. Industry analysts estimate that airlines like United or British Airways spent on average 89 cents to earn every dollar over the past four years. Estimates are that some airlines are spending up to $1.18 to earn every dollar in the current market, and so are generating losses.

Airline spending can be reduced by e-commerce and e-distribution options. However, moving an airline's sales focus to an Internet booking platform carries some attendant risk levels if the infrastructure is not able to support the increased query and booking volumes.

Revenue support functions

Airlines mostly use e-commerce to develop potential revenue streams, rather than gaining benefits of cost savings.

E-commerce can provide a significant revenue boost through revenue accounting (RA). Using an Application Service Provider (ASP) approach, where the RA system is hosted on a server and accessed via a web-portal, has significant revenue advantages.

New technology RA systems have more sophisticated auditing and revenue protection systems compared to older generation systems currently used by many airlines. ASP approaches are increasing in popularity, with the major suppliers being Dubai-based Mercator and Mumbai-based Kale Consultants.

I.T. Limitations

"One area that is often overlooked is the demand on the Internet and server infrastructure," says David Brown, head of IT at Newburn Consulting. "If you embark on a strategy to increase the amount of hits you experience then you have to be able to cater for that. A seat sale on a popular airline could generate beyond 50,000 simultaneous users all trying to book. The servers and switching systems need to be able to handle this load. If they fail then sales are not completed and the airline loses revenue.

These issues need to be considered and confronted up front as part of the project requirement. If airlines are not prepared for the traffic volume their servers can have a problem meeting demand."

This happened to BMI baby during its first seat sale shortly after launch. The seat sale coincided with a period of planned downtime for the main server, when only a back-up server was available. The thousands of hits received caused the back-up server to fail and BMI baby was unable to capture all potential sales requests. While the total volume of sales was still high, it could have been higher if there had been better technical coordination and planning.

"Airlines can often underestimate their bandwidth requirements for Internet transactions," says Brown. "Internet booking is bandwidth hungry, because it is passing and checking a lot of data between the user and server. The host server has to conduct simultaneous secure communications with the user, the reservation system, the server of the finance institution for credit card processing and potentially a CRM system. When you multiply this over thousands of simultaneous reservations you can begin to understand the size and complexity of the operation."

Despite this issue being well documented, airlines still get caught out. Freedom Air, the Air New Zealand low cost subsidiary, had to restrict access to its booking server due to excessive demand during Freedom Air's October seat sale, losing sales opportunities.

If an airline is fully Internet enabled with reservation, check-in, frequent flier programme and CRM all linked to the Internet, the bandwidth demand is almost exponential as each system you add needs to communicate with every other system.

Communication processes among new systems are based on IATA-defined rules, which have been created in consultation with leading software developers like SITA and Sabre. It is difficult to link the older IT systems to something as technologically advanced as an Internet booking engine. E-commerce is slowly making other technology suites redundant. Airlines also underestimate the demands of new systems, and can be underprepared for the surge in demand.

Summary

E-commerce opportunities exist for airlines, primarily to streamline existing business operations. To make the Internet user-friendly and attractive, airlines must address several issues.

Pricing and RM changes are required so airlines can accept bookings. Consideration must also be ready for increased demand to prevent system failures and server overload. Many airlines have lost significant sales volumes as a result of not dealing with this issue. **AC**