Strides have been made in passenger revenue management over the past 10 years, while the revenues and yields derived for freight are still based on basic principles. While forwarders & consolidators control the market, there is scope to apply systems that can enhance freight revenues.

Applying revenue management to cargo

Technology has been used extensively to deliver savings on airlines' passenger operations. The use of revenue management (RM), pricing optimisation, network planning tools and business forecasting systems is commonplace as airlines seek to maximise revenue opportunities.

Passenger systems are more sophisticated and numerous due to the number of airlines for which passengers are their primary business. These decision systems are less prevalent in the freight sector, because many airlines view freight as a secondary market that is used to fill excess belly space and supplement revenue. Can they also benefit from sophisticated information technology (IT) decision systems?

Passenger airlines, faced with increasing competition, have used IT as a competitive advantage where possible. IT as a strategic tool was pioneered by American Airlines when it developed an RM system to sell discount seats while protecting seats for late-booking, high-revenue passengers. IT has since evolved to forecast and model most variables that an airline encounters. Airlines have used passenger demand, pricing levels, passenger flows and seasonal variation airlines to develop IT systems to predict and optimise events with great accuracy.

Airlines are now using customer relationship management (CRM) data to predict what each passenger is willing to pay for a ticket, and therefore provide tailored price quotes. IT is used as a way of maximising revenue within a highly competitive framework.

Cargo management

Freight carriers have generally not evolved as rapidly as passenger airlines, and have been slow to apply passenger-developed IT solutions to the cargo business model. "Passenger airlines often see cargo as a secondary revenue source that is incidental to their primary business," says Charles Parsons, chief executive officer at Calibre Cargo. "They do not see an economic justification for the IT investment. For many airlines, cargo accounts for less than 10% of their revenue generation, so it is difficult to make a business case for heavy IT investment in cargo. There are also a few aggressive competitors in the belly-freight business which are the catalyst for change, unlike the low-cost threat in the passenger environment. The lack of competitive threats has resulted in the cargo business not evolving as swiftly as the passenger business. Cargo sales still rely on consolidators, freight forwarders and existing contracts for volumes. This means that there is little requirement for discrete pricing, since cargo is controlled by a few companies."

Freight forwarders and consolidators control most of the freight cargo business. They negotiate fixed rate contracts with airlines for belly space and then sell the belly space to the shipper, who is the customer of the consolidator, not the airline. While each airline may have a different approach to dealing with forwarders/consolidators, the general business principle is the same. Consolidators purchase freight capacity from the airline and sell it on. Some airlines sell their entire belly space to consolidators for a fixed annual price. The benefit is that the risk of filling the belly space is passed to the consolidator, and the airline has a guaranteed revenue stream. The downside is that an airline can miss out on revenue during high demand periods.

The use of freight forwarders and consolidators removes the need for the airline to retain sales and marketing structures, thereby reducing cost. When a customer sends cargo between two points the forwarder determines the routeing and the airline used, based on capacity availability, profit margin and time demands. A time-sensitive, and therefore higher revenue, package will be freighted in the most direct manner, while time-insensitive articles may take a more circuitous route. All these decisions are made by the consolidator or forwarder based on an assessment of economic return: the routeing that makes the most profit for the consolidator without inconveniencing the customer.

Reliance on forwarders means that airlines are unable to price their belly capacity according to demand. "Freight forwarders generally negotiate a high or low seasonal rate with airlines," says Parsons. "This is very similar to old airline pricing structures where they had high/low season fares and shoulder fares before airlines began to really experiment with demand-driven pricing and sophisticated forecasting methods. Moving from the current cargo price models to a new, demand-driven, model is not difficult, but there is no stimulus for change. Generally, a forwarder needs to commit certain prices to the customer so neither the customer or the forwarder/consolidator want to see price variations. It is difficult to manage that."

Demand

Demand for cargo continues to grow, with manufacturers estimating that global cargo traffic will increase by 7% per annum. With this increased volume and the continued demand, carriers are able to justify investment in sophisticated cargo management systems. The overall growth of the cargo market, combined with improved decision systems, can be combined to reduce the directional cargo imbalance, which is a major contributor to low cargo revenues. "Directional imbalance, where there is significant demand in one direction on a flight but

Freight has taken a low priority in terms of applying revenue management techniques to strengthen revenue. This is because freight accounts for a small portion of an airline's revenue, but also because there are few aggressive competitors, which would otherwise act as a catalyst to encourage airlines to evolve their freight revenue management techniques.

not in the other, is a big problem for cargo operators," claims Parsons. "If carriers are full in one direction, but empty in the other, this causes significant impact on their revenue earning potential. Combating this problem is difficult, since it involves natural cargo flows, which sometimes cannot be stimulated. If there is only demand for cargo in one direction there is little that can be done."

Directional imbalance is a factor over which airlines have little control, and no IT system will be able to assist in stimulating demand. It is possible, however, to use market-based pricing to optimise the cargo volume and revenue. Where cargo demand is low, carriers generally discount prices in an attempt either to stimulate more business or win cargo from other competitors on the route. This is the same strategy used by the passenger business. This is a self-damaging process, however, if carriers are unable to generate more volume to offset the discount.

"Carriers will generally discount to win more volume on their flights," says George Gendron, chief executive officer of iPrice. "Unless the carrier carries sufficient additional cargo to offset the discount, however, they generally lose money. This is because they are carrying more tonnes and consequently incurring a higher fuel cost, or they are discounting the freight they would have carried anyway. Whenever an airline engages in discounting this is the trade-off calculation that they need to make. It is difficult for airlines to make this calculation, however, because it requires the optimisation of multiple variables, so IT systems have been developed to do this."

System options

SITA, Sabre, LH Systems and iPrice are among several companies that have entered the cargo market with customised IT solutions to manage volume and revenue management variables. "Passenger systems can be adapted, but this involves making compromises," says Gendron. "There are interactions between passenger and cargo operations that should be considered. For example, actual and projected load factors should be taken into consideration in building a price for a cargo shipment on a specific flight for a specific day. Existing systems are not built for dynamic request pricing, and I doubt that technology sharing is a feasible option. In addition, there is no love lost between the upper and lower deck divisions of most airlines. Getting them to work together could be a challenge. All systems have benefits, however, that can be bought to cargo and airlines should evaluate them."

While cargo has not undergone the catalyst for change that the passenger business has, airlines still need to drive efficiencies into this area like all others. Before an airline evaluates any IT system they have to determine whether the business requires an IT solution, otherwise they will be selecting a system without a viable business case. They must next ensure that any system requirement delivers tangible benefits. Many IT systems have been selected without this basic assessment process, and their effectiveness is therefore unproven.

Due to the nature of the cargo industry, fewer systems are required. Pricing and revenue management optimisation has often been identified as the area that would benefit most from more sophisticated decision systems. Additionally, CRM management of shippers to determine their price sensitivity and business needs is a related area that can provide revenue benefit. "If an airline can manage the business requirements of its customers, and can price based on their ability to pay and the overall demand, then it has immediately secured most of the available opportunity in this sector," says Gendron. "Airlines would first see significant improvement in sophisticated pricing and RM systems. This is the same philosophy that drove the passenger airlines, so cargo needs to catch up."

Cargo pricing

Cargo is reliant on consolidators and forwarders for most of its revenue and rates are fixed, often one year in advance. Moving from fixed pricing to variable pricing is not easy, since forwarders have multiple options. If a carrier initiated dynamic pricing, and the cost of shipping became less certain, a forwarder would probably move the freight to another carrier with which it had a fixed rate.

While this is a risk there are ways of mitigating it. A carrier would be able to offset the risk, if there were sufficient cargo demand. By 'spilling' the lower revenue cargo to other airlines and being available for consignments closer to the departure time, airlines could maximise revenue from freight. This process is used daily with passenger demand, and the theory is easily transferable.

"Passenger airlines have already moved towards segmented product offerings aimed at product differentiation," says Gendron. "Dynamic pricing processes will be instrumental in achieving this on a large scale. From a cargo perspective, the job is easier, because the number of layers separating supply from demand is much shallower. Web-based gateways can be designed and built to interact with all components in the distribution chain and supply dynamic pricing options.

"As with passenger airlines, shallowly-segmented, static pricing placed in the market as a published rate is now outdated," continues Gendron. "Whether

Freight forwarders and consolidators control the majority of the belly freight business, and negotiate fixed rate contracts with airlines. Cargo space provided by airlines is then sold by consolidators to shippers. This means airlines pass control of freight revenues to the consolidators and forwarders.

an airline's cargo division is pricing directly or via a freight forwarder, the critical elements defining an optimised price can be taken into account. Properly configured, dynamic pricing can be set up so that it responds to every request, regardless of the point of origin and routeing. Our process can recognise whether a price request comes from the airline's website, a specific freight forwarder, or a cargo portal. Cargo operators can consider all factors in establishing a price, including past and potential business, and handling congestion at origin or destination airports. For example, if a shipper definitively identifies a specific flight with high demand, then the price quoted must reflect this. Conversely, a low price will be reflected on low-demand flights."

If an airline knows the demand, and can price accordingly, then the potential is huge. While airlines may not do this because of the historical method of doing business, the potential for change is there. The first step is to convert data into business intelligence. Data that identify demand by product, overall demand and average yields based on time of day and day of the week are important variables. "The major data inputs required would be cost, product profile, airline product profile, shipper profile, distribution profile, and market parameters", says Gendron. "These would be identified and drawn from various airline data sources through an application programming interface (API) and/or airline data stored in other databases."

Airlines need to capture eight to 10 variables to develop a robust forecast. They usually have these data but extracting them can be difficult. Many pricing optimisation systems run on Oracle databases or similar, while cargo data are often stored on legacy systems that include Cobal as their base language. Data conversion is therefore critical.

Once an airline has developed the database and has a robust method for updating, it can begin to forecast. Generally the preferred options for forecasting are standard statistical functions like regression, weighted average or simple averages. While some systems use highly sophisticated forecasting methods, even the more basic methods provide great accuracy. An MIT study on passenger RM found that regression was the most stable and accurate method of forecasting.

"Once the data are clean we go into a price optimisation loop that determines price at any given point in time," says Gendron. "A price response to a query is driven by the available capacity, the demand that is still to come, the no-show/cancellation factor and the airline's competitive offering relative to other carriers. If, for example, an airline had a dominant route where it was the fastest way between two points, the price would be higher than if it was competing with many other airlines and the elapsed time calculation on all options was similar. Airlines will lose money if they price without taking the competitive environment into consideration."

Price optimisation needs competition data, which most airlines have, to be aligned to customer data. If an airline knows that a customer needs to ship products close to departure they can plan, and charge, accordingly. Statistically, even the most volatile of markets can be predicted with a high degree of certainty if there are sufficient observations. "The more data observations that you can get the better the forecast," says Parsons. "With multiple observations even the smallest variation can be planned for and anticipated. Airlines that have adopted these methods have a significant advantage over those that have not."

Cargo pricing, like passenger pricing, can produce multiple price points for any product. If an airline is selling its capacity at different price points it will need an RM system to control the availability that is placed in the market at any given price, so an RM system must also be used to manage the demand and price variables generated by a dynamic pricing system.

Cargo RM

RM is often defined as selling the right product at the right time at the right price. RM is used to anticipate demand, protect space for high revenue items, and make excess capacity available at lower rates to ensure that the plane is filled. This applies equally to passengers and freight. RM uses forecasting algorithms to predict future demand based on historical performance. An RM system will optimise a flight that is due to operate in 40 days by evaluating the same flight from the previous week, month and year at the same reading point (40 days prior to departure). If the flight is full, the RM system will close low revenue price points and charge higher levels. If the flight is empty the RM system will ensure that all price points are open.

RM for passenger operations is a sophisticated process and airlines have mastered the systems. This technology can easily be transferred to cargo. One of RM's major traps is decreasing fares. When customers resist paying high fares, demand is low; when they want to pay low fares, this results in high demand. As a result RM systems allocate availability to lower fares because that is where the demand exists. To avoid this trap, freight RM must ensure that the demand levels are well defined and the RM system does not keep factoring in low-fare demand. This is caused by customers who would prefer to purchase capacity at the low end of the demand curve, where the price is cheaper, and avoid the high end of the demand curve where the price is high. This natural regression to lower prices is difficult for an RM system to adjust for, and the optimiser calculates that demand only occurs at the bottom end of the price

There is generally little co-operation between passenger and freight departments, but the interactions between passenger and freight operations should be considered.

curve. It will subsequently set all prices in that range and lose the airline revenue.

"The greatest benefit in RM arguably comes from system collaboration," says Gendron. "RM and Passenger Service Systems on the passenger side need to interact with internal processes on the freight side to optimise overall revenue. For example, Air Canada offers are deductions for travellers with no checked baggage, because it believes that it can achieve savings like quicker check-in and zero handling on these passengers. This is prevalent on routes where day-trips or short-stay business trips result in a higher percentage of passengers with no checked bags, and offers additional space that can be used for express cargo. Consideration for this type of systemic collaboration and potential revenue optimisation cannot be achieved by today's processes and systems, but it can be developed."

Airline benefits

The installation of any IT system must be based on a sound business case. Too many projects have failed because the IT system has not delivered the expected results. "IT is designed to assist in the decision process," says Parsons "Airlines still have to monitor an IT system, and assess whether it is making correct decisions, otherwise the process is wasted. Airlines can generate improved revenue and profitability from pursuing a project like this, but they have to understand the possible risks as well as the rewards."

IT systems offer immense benefits if applied correctly. "The most important question that airlines want vendors to answer is what tangible benefit they would get if they invested an IT system," says Gendron. "Although it is more difficult to quantify the cargo benefit than on the passenger side, dynamic quoting generally improves pricing by 4-5% or more for airlines that employ it. Of even more importance, however, is that every 1% of price improvement can translate into an improvement of up to 11% in operating profit."

While established customers may resist a variable pricing model, the benefits are obvious. Airlines can determine what they charge for any cargo item based on several criteria. Customers can determine the cheapest option for them based on similar criteria. Generally, time to market has been the major price driver, with customers paying more to have an item shipped swiftly. This is unlikely to change. Airlines can vary the price that they charge for different goods, however, based on the demand for belly capacity and the market dynamics.

Performance measurement

While vendors may tout improved revenue, higher load factors and greater profitability as reasons for using cargo IT systems, airlines have to be wary of these claims. Many IT projects have floundered because vendors cannot substantiate their claims of improved efficiency or profits. So how would an airline measure the success of this type of system?

"To measure how well the system is performing you have to go a bit beyond the traditional 'before and after' analysis that people generally employ," says Parsons. "If yield improvement is growing in line with the overall airline aircraft tonne kilometres (ATKs) and gross domestic product (GDP), then the project has not been a success. Beyond that, you have to look at the overall pricing decisions that are being made. One easy measurement method is if more is being charged for freight closer to departure. Another performance measure is determining whether your load factor remained constant or increased, and the yield improved."

Generally, it is difficult to determine the benefit to the bottom line of any IT system, but it is vital that this is done. The best way is to determine how the system's performance is to be measured, and then design assessment parameters to capture this. If the IT system does not meet the pre-agreed measurement criteria then it has to be reviewed to identify the shortcomings. Many IT companies estimate that systems can deliver a 1-2% revenue improvement on the existing 'steady-state' performance of an airline, so this is the target range that any improvement must deliver.

Summary

Freight has not experienced the huge demand for change that passenger service has, and consequently the evolution of the cargo model has been slower. Fixed fare levels, negotiated volumes, and volume guarantees are commonplace in cargo, while they are rare in the passenger business. Subsequently, to gain significant leverage in cargo IT to optimise revenue, an airline needs to determine if it is willing to divert from the current cargo business model. If a carrier remains with the current business model it is doubtful if it will see a substantial return on investment (ROI) on any IT system.

With total revenues of over $62 billion in 2004, international air cargo is a significant business. Despite this, most commercial airlines, which accounted for 47% of international cargo revenues in 2004, operate cargo as a by-product of carrying passengers. The industry is typified with decreasing yields and a declining ability to control pricing. Structural change is inevitable. Cargo operators should be able to price freight based on the realities of the market and the needs of the shipper, and will therefore require IT solutions to assist in this process. AC