



Airlines

REVENUE MANAGEMENT



Introduction:

From being used in battlefields to track enemies to being used as airmail, from transporting bolts of silk to transporting passengers, from deregulation to globalisation and from internationalisation to the recession, the aviation industry has undergone a plethora of changes. Today, aviation is one of the primary pillars of the transportation industry, promoting economic development, generating employment opportunities and facilitating trade and tourism. In fact, the aviation industry is evolving rapidly and will continue to grow. This makes optimising revenue management capabilities not only important but also inevitable.

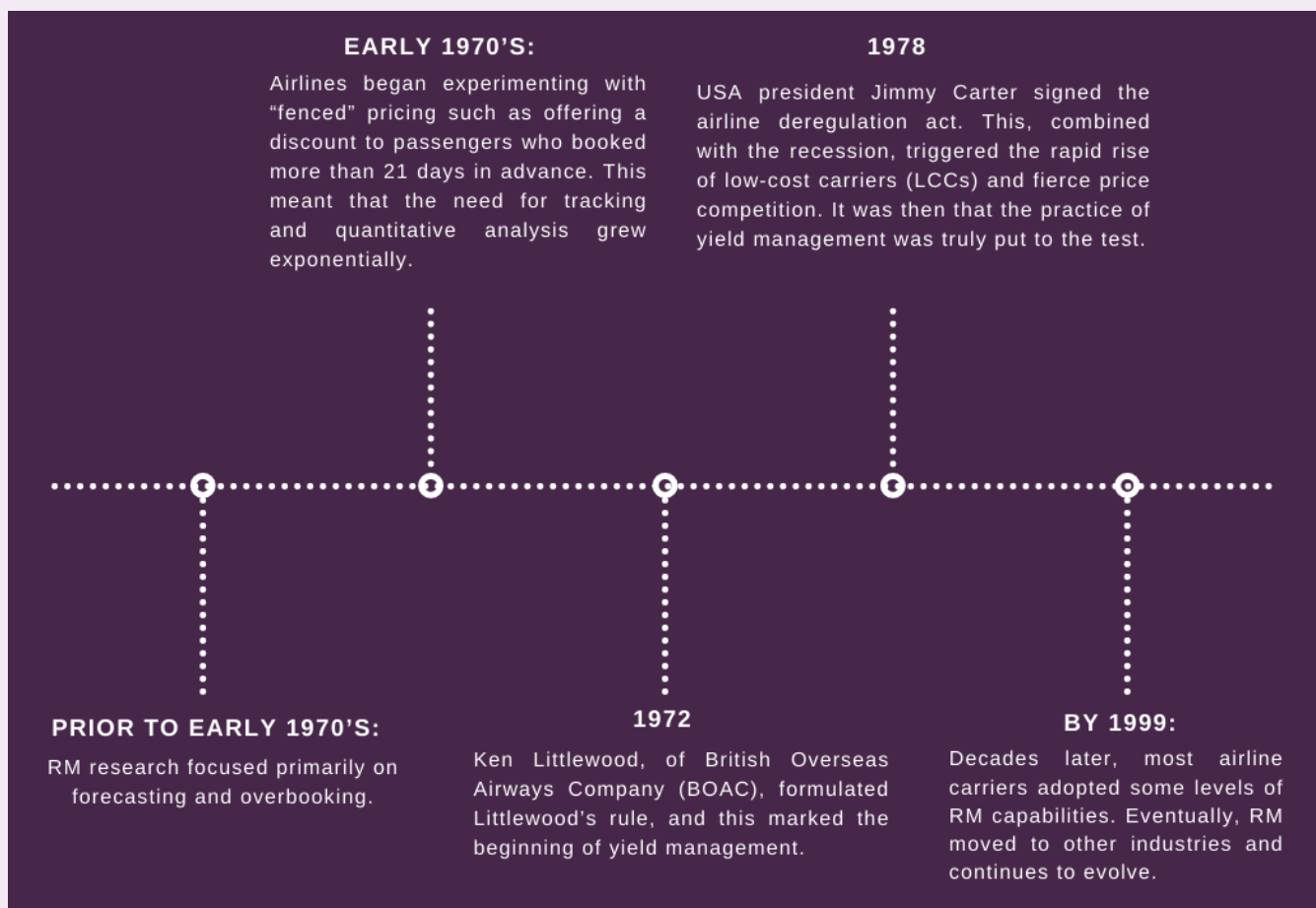
Revenue Management is the concept of maximising revenue by selling the right inventory unit to the right customer, at the right time, and for the right price (Kimes 1997). Typically, RM assists airlines in

managing two types of costs:

(a) Spoilage Cost: the cost associated with unsold seats on a flight

(b) Spill Cost: the cost of accommodating passengers who have been turned away due to overbooking.

American Airlines' former Chairman and CEO Robert Crandall once said, "Revenue management is the single most important technical development in transportation management since deregulation" and we strongly concur with him. Interestingly, the aviation industry was also where it all started. In fact, the airline industry has been credited for developing and adopting some of the foundational concepts of Revenue Management. Let's better understand how it all went down with a timeline. Here is a brief overview:



Industry Overview:

Airline Business Models:

Low-Cost Carriers: Low-cost carriers, also known as no-frills or budget or discount carriers, typically offer lower fares and lesser comforts. The core business for an LCC is to get a passenger from origin to destination. Everything else (such as lounge services, baggage or in-flight meals) is considered a frill or a luxury, which can be acquired at an additional cost. Here, price is the key competitive factor (cost leadership strategy). LCCs do not segment passengers on their willingness to pay. They offer one-way, short-haul, non-refundable or partially refundable tickets. The Saturday night rule does not apply. Additionally, LCCs often rely on secondary airports and lean distribution systems. Prominent examples include: EasyJet, Ryanair, Wizz Air and Indigo

Traditional Full-Service Carriers: Full service carriers, often referred to as legacy carriers, are characterised by their greater budgets, higher prices, ancillaries (such as in-flight entertainment and catering) and multi class services. They operate from major airports, have diversified distribution systems, and adopt differentiation strategies. Prominent examples include British Airways, American Airlines, Singapore Airline and Czech Airlines.

Note: While LCCs and FSCs are the primary business models, some airlines are drifting towards a hybrid approach i.e. LCCs adopting some FSC practices or vice versa. For instance, in 2020, Norwegian launched several long-haul routes, breaking the typical LCC tradition.

Airline Market Segmentation:

Typically, airline carriers tend to segment passengers on the basis of time sensitivity and price sensitivity. Broadly, we can identify two categories: (a) Business Travellers: Business Travellers are price inelastic. Since ROI is highly quantifiable for business travellers, they have high time sensitivity and low flexibility to change, i.e. time is extremely valuable and they need to travel on particular days and particular time periods. (b) Leisure Travellers: Leisure travellers have low time sensitivity but high price elasticity. Leisure passengers are willing to travel on days of low demand and are looking for the best possible deals. However, as work-life boundaries blur and more people prefer to work remotely, a new segment has emerged- Bleisure Travellers- who are neither business travellers nor leisure travellers, but simply a combination.

779 BILLION

US DOLLARS

Anticipated 2023 Airline Revenue

4%

EXPECTED CAGR

87.7

MILLION JOBS SUPPORTED

12%

of Passengers are Business Travellers

75% of airline revenue

Comes from Business Travellers

254 BILLION USD

Forecasted LCC market size by 2027

Common Pricing Practices:

Considered a *search good*, price competition is not only inevitable, but it is the *raison d'être* for competition in the airline industry. Overview of the common pricing strategies followed:

(a) Segmentation Pricing: A price discrimination strategy, wherein buyers are segmented into groups based on certain characteristics and charged differently. For instance, Airlines often charge different prices to business class and economy class passengers. They can do so because business class passengers and economy class passengers have different price elasticity of demand.

(b) Advance Purchase Pricing: Offering lower prices to customers booking in advance. The benefits of advance purchase pricing are two-fold: (i) Allows the supplier to predict the volume of traffic and plan accordingly (ii) The supplier benefits from advance cash received from customers.

(c) Delayed-Service Pricing: Airlines routinely overbook. A simple overbooking model:

An Airline Reservations Manager finds it lucrative to increase B to $B + 1$ if the following condition holds:

$$P(S \leq N) * R - P(S > N) * C = P * R - (1 - P) * C > 0$$

Solving the expression for $P = P(S \leq N)$:

$$P > C / C + R$$

B = Bookings

S = Bookings that Show Up (Difference between booking and survivals in the number of no-shows)

N = Capacity/Number of physical seats on a flight

$P(S \leq N)$ = Probability of Spoilage and $1 - P(S \leq N)$ = Probability of Over Sales

C = Denied Onboarding Cost (Over Sale Cost)

R = Spoilage Cost

P = Probability of spoilage if bookings are curtailed at B

In scenarios where the number of passengers ready to board exceeds the number of seats, the airline requests volunteers to take a later flight at a minimum payment. Bumping passengers to the next or successive flights with empty seats will be profitable as long as it results in an incremental contribution to the airline's overhead and profit.

(d) Peak-Load Pricing: Demand for air travel tends to have daily, weekly and seasonal peaks and troughs. During peak times, airlines are overbooked and airports are overcrowded. In order to avoid this situation, airlines try to shift their demand to off-peak times by offering lower-fare tickets. This allows airlines to reduce costs during peak periods and increase revenue during off-peak periods, resulting in increased profitability (Evan D, 2011).

(e) Risk Sharing pricing: Airlines issue non-refundable or partially refundable tickets and charge a penalty in the case of cancellation or change in itinerary. This allows airlines to appeal to risk-averse passengers, deal with moral hazards and generate revenue through the reissue of cancelled tickets.

(f) Bundle Pricing: Airlines bundle ancillary goods and services (ex: extra baggage and meals) with the basic services and charge a premium for it. The cost of these bundled goods being lower than the incremental price paid by the customer makes this a profit-making strategy. Ideally, a rational buyer must feel the monetary value of the benefits provided exceeds the additional price levied. In fact, not only in flight services, airlines also provide other bundling services such as hotels and car rentals.

(g) Continuous Pricing: It is an extension of dynamic pricing, wherein airlines are no longer restricted to the traditional 26 alphabet-based fare buckets and can have myriads of pricing possibilities. So, instead of directly increasing the fare from \$90 to \$120, the next higher fare could be, say \$100 or \$111 (or anything in between). Continuous pricing offers an increased granularity in pricing and helps better match between offer and demand.

Comparative Study:

For the purpose of comparison, we narrowed down our focus to two airline carriers operating in the Czech market:

- (a) Czech Airlines/CSA (full-service carrier)
- (b) Easyjet (low-cost carrier)

Primarily, the focus was on two routes: PRG-CDG (Prague-Paris) and PRG-AMS (Prague-Amsterdam), across multiple time periods. The purpose of this comparative study is to understand how LCCs differ from FSCs and the pricing strategies deployed.

Airline	CSA/CZECH AIRLINES	EASYJET
Category	Full Service Carrier	Low Cost Carrier
Segmentation	<p>(a) Economy Class: Lite Package, Flex Package and Plus Package</p> <p>(b) Business Class: Business Package and Business Lite Package.</p>	Easyjet only offers a single class
Pricing Strategy	<p>o. From figure one (ticket prices (PRG-CDG) against days to departure):</p> <p>CSA, being a legacy carrier, adopts a capacity-allocation-based pricing strategy. Here, the airline allocates seats in booking classes for a fixed price. The availability of booking classes is managed by bid pricing, and if the booking velocity does not develop as the system expects, bid price drops (can be observed by the sudden drop in CSA's ticket price when there were 23 days to departure and 6 days to departure)</p> <p>o. From figure two (ticket prices on route PRG-AMS, one day stay):</p>	<p>o. From figure one (ticket prices (PRG-CDG) against days to departure):</p> <p>Easyjet, being an LCC, follows a dynamic pricing strategy, wherein ticket prices increase gradually as the date of departure approaches (i.e. Easyjet's ticket prices follow an upward trend, from 2000 CZK to 5000 CZK). In fact, Easyjet's official website describes its pricing strategy as 'Prices usually increase as seats are sold. So, generally speaking, the earlier you book the cheaper the fare will be.'</p> <p>o. From figure two (ticket prices on route PRG-AMS, one day stay):</p>

Pricing Strategy

Conditions such as the minimum stay rule and Saturday night rule are implemented by traditional airlines (CSA) to separate business travellers from leisure travellers. Using the minimum stay rule, the return prices are priced higher immediately after the departure flight. For instance, a return flight on the 7th day might be cheaper than the one 3rd or 4th day. This is when the minimum stay is 7 days. This is executed considering the fact that business travellers are time sensitive and will pay a higher fare to return on the intended date of return. It is possible to infer this phenomenon from the graph; CSA starts a day trip at about 8500 CZK with a gradual price increase closer to the departure into the range of 10000-13000 CZK.

The Saturday night rule interferes sometimes with the minimum stay rule. This rule stems from the idea that business travellers are less likely to spend their Saturday nights at the location of travel. They travel on weekdays and return before Saturday. Hence discounted prices are offered on weekend combinations (Saturday-Sunday) keeping in mind the demand for these is from leisure travellers. In the figure the effect of this rule can be seen, in which the fares for Saturday-Sunday drop significantly for CSA.

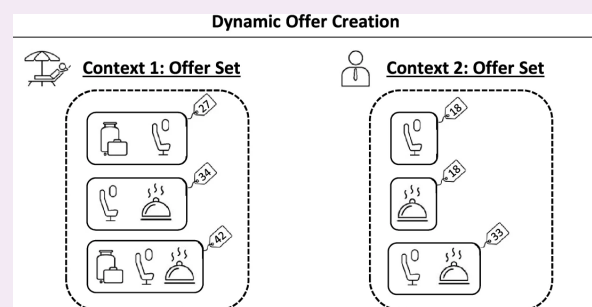
EasyJet offers flights on this route without any restriction in the price range from 2000 to 5000 CZK.

Opportunities in Airline Revenue Management:

We have identified three potential opportunities:

1. Personalisation of Ancillaries: Personalisation in the airline industry refers to the generation of offers based on passenger information. In fact, according to a report by BCG, “Brands that create personalised experiences are seeing revenue increase by 6% to 10%”. How this applies to the aviation industry is yet to be explored, and we strongly believe that it can be equally rewarding. Here, personalisation would require the implementation of two conditions: (a) The ability to recognise the characteristics of the passenger booking the fare and (b) The ability to dynamically adjust offers in real-time to meet the individual needs of the particular passenger, via Dynamic Offer Generation using Markov chain choice model. Let's see an illustrative example of how this works. Context 1 is an offer created for a leisure traveller while Context 2 is an offer created

Source: K K Wang, 2023



for a business traveller. Do you notice a difference in the pricing and composition of the two offers? As compared to a business traveller, a family on vacation might prefer a bundle of checked-in baggage and seat assignment. Additionally, the bundle containing a seat and a meal in context one is charged \$34, while the same bundle is priced at \$33 in the second context. Hence, the prices can also be varied, contextually.

2. Tap In-flight Connectivity: For decades now, airlines have been reliant on traditional ancillary services i.e. seat selection, baggage and in-flight meals. Presently, it is necessary for airlines to move beyond the traditional construct of ancillaries and one such opportunity is: inflight connectivity. While airlines have been offering some level of connectivity for a while, it has not yet been fully capitalized. According to research by the London School of Economics and Inmarsat, “Airlines earn an average of \$17 per passenger from traditional ancillary services. Broadband-enabled ancillary revenues will add an extra \$4. By 2035, the inflight connectivity market will be worth \$130 billion globally, with airlines standing to gain \$30 billion in broadband-enabled ancillary revenues”. In fact, multiple reports have identified that a majority of bookings are done on arrival at the destination. If passengers are going to pay for a last-minute car rental or hotel room anyway, why not do it through the airline’s shopping portal instead of a third-party site? Here, airlines will be able to generate significant revenue margins through multiple streams: broadband access, commissions, partnerships and advertising.

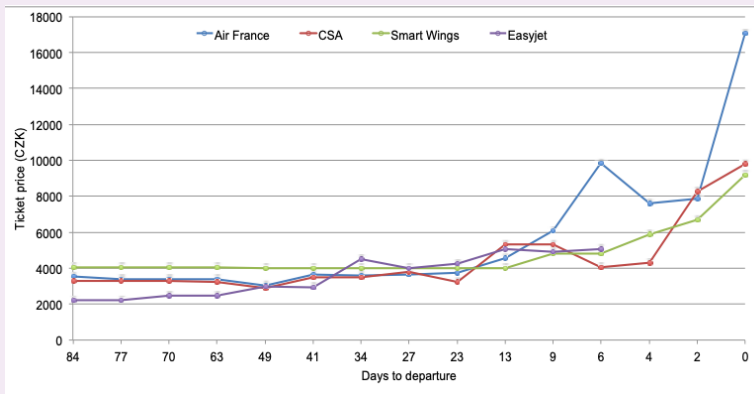
3. Leverage Artificial Intelligence: Airlines have relied heavily on historical data and legacy methodologies for the process of decision making. Specifically, past data has been crucial for forecasting passenger demand. However, this approach has two limitations: (a) Currently, the nature of demand environment is highly volatile (especially post-pandemic) and (b) The airline industry is rapidly changing. Earlier, airlines were just focussed on predicting the number of passengers travelling from a particular origin to destination, but today there are many other factors/variables to be considered. This makes past data an inefficient precursor to predicting future demand. However, by leveraging the power of AI, airlines can deploy tools (such as deep learning algorithms) on data (such as bookings, capacity, weather condition, business events, leisure events, airline searches, local occurrences, competitor data etc) to accurately forecast passenger demand and eventually optimize revenue by pricing along the demand curve. In fact, not only forecasting, but AI can also be extended to better implement segmentation, dynamic pricing, personalized pricing and continuous pricing strategies.

TO-DO LIST:

- ✓ Frontline employees play a crucial role in delivering ancillaries (Figure 3). Hence, training, educating, motivating and up skilling frontline workers is critical. Foster a culture of innovation and experimentation, where failure is viewed as an opportunity to learn and develop.
- ✓ In the airline industry, the RM department is often isolated from other departments. To leverage the above opportunities, it is important to adjust the organisational chart and break down silos (improves data visibility, and encourages communication and collaboration).
- ✓ Hire Data Scientists and Analytics Experts: Data scientists play a crucial role in the aviation industry. It is not only important to recruit the right talent, but airlines must look beyond the traditional approaches and hire employees (even from other industries such as retail or trade) with the necessary expertise.
- ✓ Technology-enabled RM will eventually mean increasing use of passenger data. Topics surrounding price discrimination, data rights and customer privacy have long been debated. Thus, it is necessary for airlines to ensure compliance with General Data Protection Regulation (GDPR) and always take explicit consent from passengers.

Appendix:

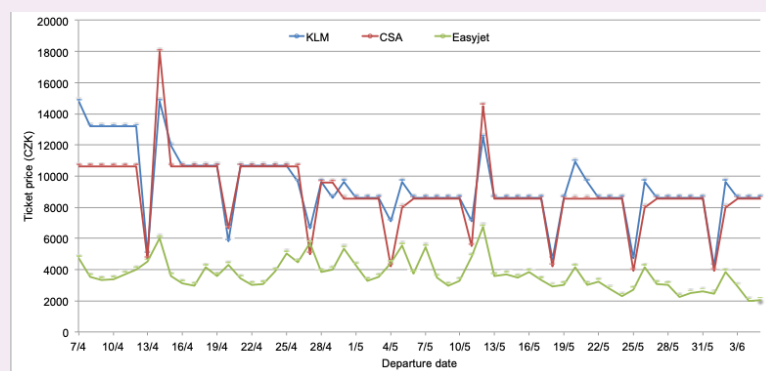
Figure 1 :



Note: for the purpose of this research, we narrowed down our focus to Easyjet and CSA

Source: Lubomír Fedorco & Jakub Hospodka.

Figure 2 :

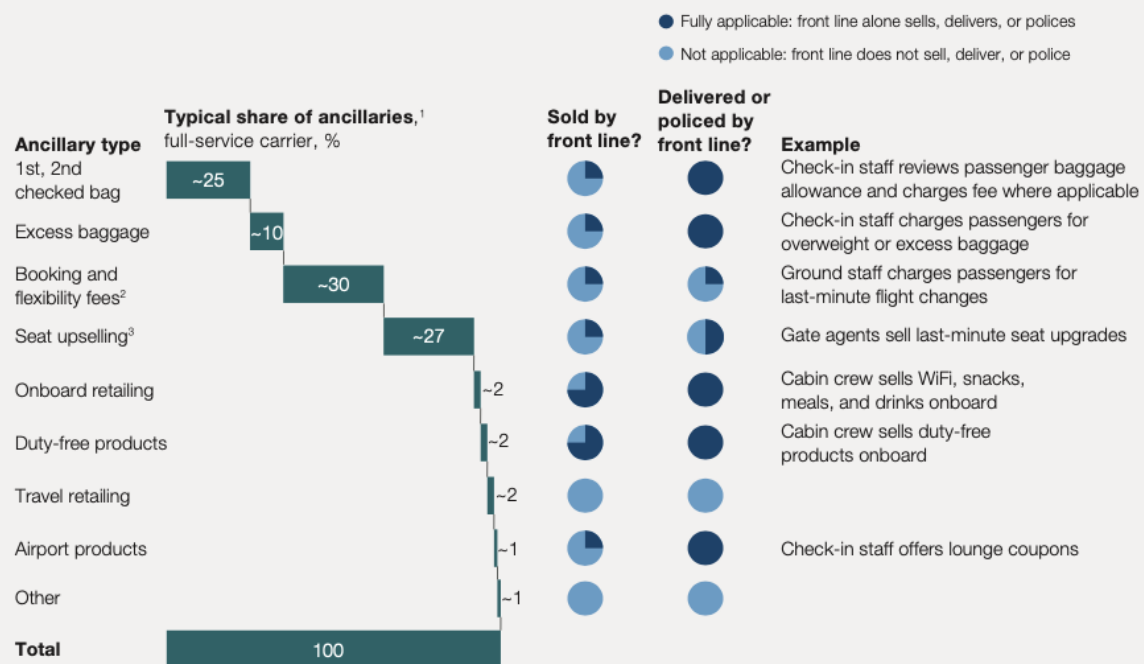


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Source: Lubomír Fedorco & Jakub Hospodka.

Figure 3 :

The front line plays a significant role in ancillaries, selling products and services responsible for about 30 percent of these revenues and delivering or policing about 60 percent.



Although many ancillaries are now sold online or through self-service options, frontline staff delivers or polices about 60% of ancillaries and can both limit revenue leakage and upsell products and services.

Source: McKinsey, 2019

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