The rise and fall of RM

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ABSTRACT This article takes a look at the history and evolution of airline revenue management (RM) from a traditional network carrier's point of view. It focuses on changes that have been mainly caused by increasing low-cost competition and increasing price transparency in the Internet. Finally, it gives an outlook how RM might change in the future.

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When I joined Lufthansa more than 15 years ago my first job was to support a revenue management (RM) project that introduced origin and destination (O&D) bid price control. I learned a lot about the basics of RM like market segmentation, fare restrictions, demand forecast and optimization methods. I also learned that theoretical ‘optimum’ methods might not perform best in practice because of several reasons. One of them is incompleteness and missing quality of the necessary input data, a problem that does not exist in the clean data sets of OR laboratories. Furthermore, many of the assumptions that RM methods are based on don't hold in practice, that is the basis for optimality is not given. In addition, the global airline distribution systems (GDSs) have some deficiencies since they are based on

- booking classes (limitation to 26 price points);

- pre-published fares (no online price changes possible); and
- de-coupled processes of booking and ticketing/payment (room for cheating).

In those times RM at Lufthansa had a narrow focus on optimizing the availability of fares given a schedule from the network planning department and given fares from a separate pricing department. Optimizing the fare structure was a task that has been done by separate people based on different data and different tools. There was no deep integration of RM and pricing beside some regular communication.

Although the forecast and optimization methods in RM tools were based on the incorrect assumption that demand is independent between products and booking classes the revenue results were good since fare restrictions like ‘Saturday night stay’ are quite effective in

segmenting business from leisure traffic. Over the years increasing computer power allowed Lufthansa to enhance the RM methods and implement O&D forecasting and network optimization. The developments concentrated on sophistication rather than on extending the scope. RM tools remained myopic in the sense of ignoring competition and looking at own airline data only.

During the 1990s low-cost airlines came up in Europe. Like other inventions they were first ignored, then smiled at, later fought and finally copied (to some extent) by the traditional network carriers. For many years network carriers anticipate and hope that market saturation will pose problems to their low-cost competition. But the major low-cost airlines are still successful in stimulating new markets and attracting demand from other carriers. In 2004, their European market share reached 10 per cent and is currently above 20 per cent.

Low-cost airlines usually have a simple and transparent price model. They fly point to point and at any time there is only one price available, which increases towards departure. This price concept segments the market by booking time only. In contrast, global network carriers offer many products and fares in parallel with a complex mixture of round trip O&D fares for many markets and all sorts of fare restrictions.

Owing to the success of the low-cost airlines and driven by increasing price transparency in the Internet the network carriers started to simplify and lower their fare structures. They dropped or at least relaxed many of their fare restrictions. Although this simplification helped in being more price-competitive at the same time it caused problems in the RM tools. The 'independence of demand' assumption that RM tools were based on got more and more wrong and forced a well-studied spiral down effect of yield and revenues. Revenue managers tried to stop this spiral down by manual actions that closed lower fares. While automated decision support dominated in the first decades

of RM the need for manual interventions reversed this trend.

Recently, most of the RM vendors enhanced their tools box by more sophisticated forecast and optimization methods that explicitly model buy-down and sell-up behavior in order to deal with dependent demand. Although those methods are effective in preventing buy-down they can't fully compensate the revenue loss caused by ineffective market segmentation.

As a side effect of relaxing fare restrictions responsibility is shifted from pricing to RM, as the original pricing task of market segmentation by an optimized fare structure gets less important if most of the customers buy the lowest available fare. The RM and pricing tasks get more integrated and nowadays many airlines have merged their RM and pricing organizations.

A problem for traditional carriers is that by simplifying their fare structure they are moving towards the dynamic pricing concepts of low-cost carriers while their main distribution channels (GDSs) don't adequately support that trend. The availability display in GDS is based on booking classes, which are designated by one character of the alphabet which limits the number of price points to 26. Furthermore, airlines can change their fares in the GDS only by filing them via the Airline Tariff Publishing Company, which is not an online process and has a substantial time lag. GDSs don't allow dynamic price changes, as they are possible at low-cost airlines' web sites. The network airlines have to live with the burden of historically grown complexity of tariff data structures and technical distribution processes that are not necessary for simplified price concepts.

The myopia of RM has gradually been reduced over time by taking current prices from competitors' web sites into account. There are vendors that use web crawlers to constantly grab this data and sell it to interested airlines. Currently, the competitor prices are mainly used as decision support for manual

adjustments to RM control parameters rather than in an automated way. It might be even dangerous to react on competitor price changes automatically since this can cause price wars at a different (and less controllable) level than we known from published fare structures. At least some additional safety nets are necessary for an automated reaction on competitor prices. So far the best way to incorporate competitor information into RM methods is still unclear and under research.

Over the last years the increasing competition and cost pressure caused a concentration of the airline industry by mergers and alliances. Pricing and RM of aligned airlines has to be harmonized on order to use the potential synergy. Enforcing O&D control on code share and interline connections is still a problem for the alliance partners since the GDSs do not support it and additional functionality like cascading and bid price exchange has to be implemented in order to make it happen (Figure 1).

With all these problems – has the fall of RM already begun? I would call it rather an evolution than a fall. The traditional way of

doing RM won't survive. RM has to change and its future is about integration with pricing. Price optimization including competitive aspects has been studied in other industries (for example, retail) for many years and RM researchers will bring both streams together. This trend is also reflected at conferences where presentations about 'classical' RM topics decrease while pricing sessions get stronger and stronger.

And in conclusion, my vision for 2020 is the following: RM and pricing are fully integrated. The GDS limitations are less important since network carriers have enhanced their web sites to cover the whole distribution process including online price calculation and ticketing. The majority of sales are done in the Internet. Cost pressure has forced network carriers to reduce complexity while low-cost carriers have gradually increased their complexity. The difference between both types of carriers has become smaller. Price changes for a specific flight departure happen more often and more continuously than the current price jumps and RM forecasters generate price demand curves rather than forecasts at booking class level.

Figure 1: The rise and fall of RM.