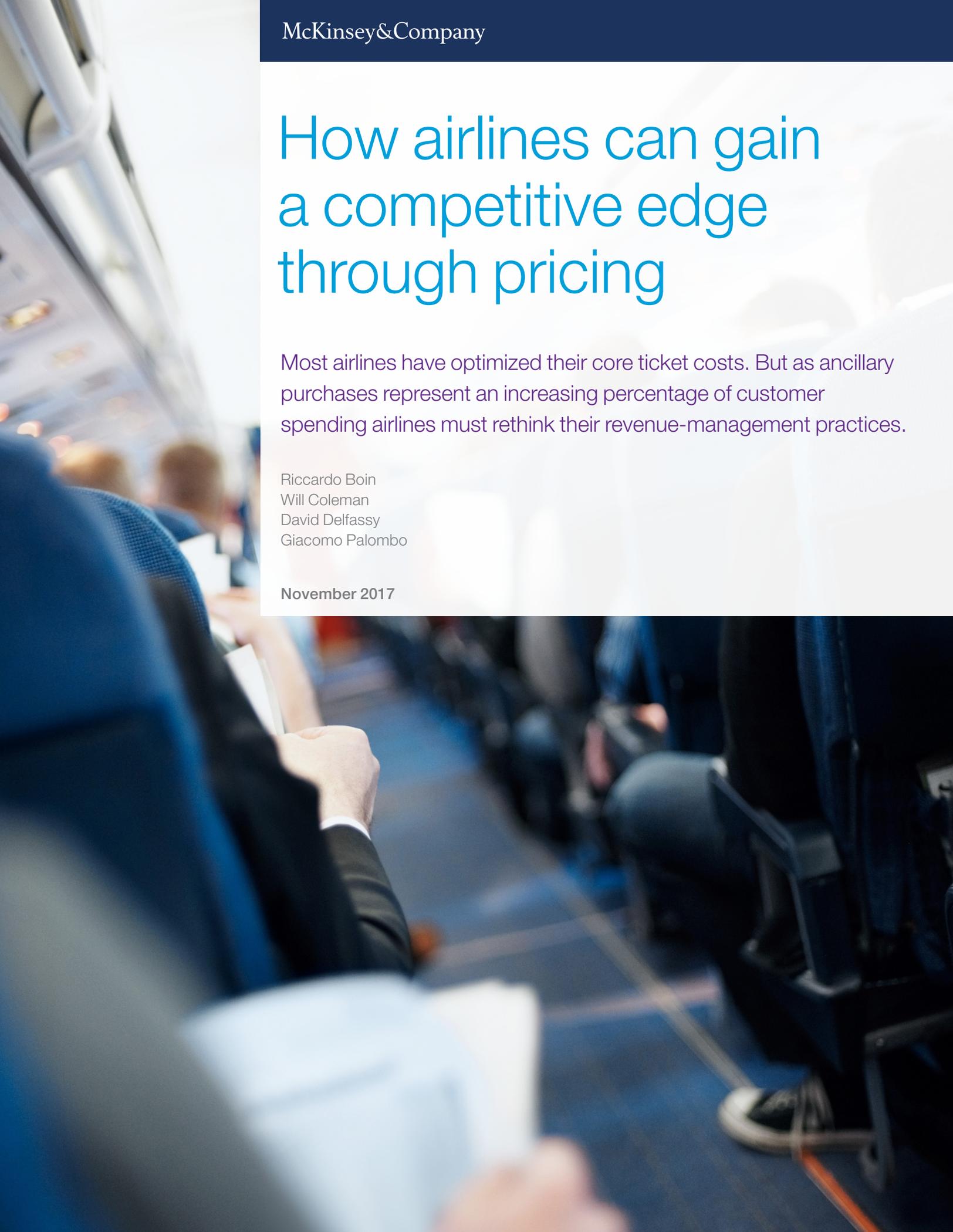


How airlines can gain a competitive edge through pricing

Most airlines have optimized their core ticket costs. But as ancillary purchases represent an increasing percentage of customer spending airlines must rethink their revenue-management practices.

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Introduction

Airlines have been early adopters of cutting-edge revenue-management (RM) technologies since the 1970s. They were among the first companies to use dynamic inventory pricing, and some of the forecasting and inventory-management models they introduced in the 1980s and 1990s—including sequential upgrades to forecasting and optimization engines and the expanded use of fare restrictions, or fences—represented the vanguard of advanced analytics at the time. These and other RM tactics successfully clustered customers according to their key attributes; for example, they distinguished the occasional leisure vacationers from the weekly business travelers. This clustering generated significant additional revenue and contributed significantly to the growth and success of the airline industry.

To date, airlines have focused mostly on how to price core tickets. However, this approach ignores a recent, fundamental industry change: an increasing percentage of revenue now comes from ancillary items such as checked baggage, onboard food, premium seat selection, and extra legroom. Given the growing importance of ancillary sales, airlines cannot continue simply to tweak their existing RM strategies and models expecting to optimize total revenue. Instead, airlines must optimize total revenue by taking attribute-level customization a step further. They have an opportunity to adopt bundling tactics, product-suggestion analytics, and dynamic pricing to create customized recommendations for additional purchases, both at the original point of sale and over the course of the travel journey. These tactics are already employed by other industries (notably online retail), and with the increasing power of advanced analytics, airlines can profile customers in ways not possible just a few years ago.

To move toward the next frontier of optimized total RM, airline industry leaders must overcome significant complicating organizational factors. For instance, RM departments at most airlines are siloed from other departments, such as sales and marketing, which hinders their ability to collect and wield the customer data needed to optimize total revenue. In addition, few airlines employ data scientists, which prevents them from harnessing the latest advanced analytics tools to create cutting-edge predictive and prescriptive revenue-optimization models.

If airlines work to address these shortcomings, we estimate they could reap a 5 to 10 percent improvement in total revenue. To achieve this goal, however, airlines must act soon, and they must develop these capabilities in-house. If they wait along with all the other airlines for RM systems providers to innovate on their behalf, they will lose their chance at a competitive edge. In an era when optimization of distinct processes and departments has met its ceiling, this opportunity is too big to pass up.

Opportunities for optimizing total revenue

Airline RM today is an exercise in setting prices and managing yield through inventory—how many seats are left, and what is the highest price we can sell them for? But in the quest to optimize total revenue, inventory is just one input to the final price presented to a customer. To realize the potential of total RM, airlines must adopt a bundled model that considers not only ticket price but also the probability that passengers will purchase other goods and services from the airline before, during, and after their journey.

But most airlines do not have the analytical capabilities that are essential to making those types of predictions. In fact, the software necessary for total RM optimization does not yet exist, as most software providers are still focused on optimizing ticket revenue through increasingly advanced forecasting and optimization (for example, origin and destination forecasting and optimization). Airlines will need specialists who can create these models from the ground up rather than operations researchers who can tweak existing models.

In short, no one in the airline industry is doing RM optimization well right now because the tools are not yet available, which means airlines will need to build them in-house. The good news is they can draw on lessons from the pricing and bundling models used by leaders in other industries; online retailer Amazon is a solid example of how to rise above competitors and increase consumer spending.

Amazon: A leader in bundled pricing

Amazon's total RM leadership is rooted in pricing models that rely heavily on automated algorithms to deliver real-time, customized pricing. Amazon's method, backed by a pricing team of 16 experts and 1,400 developers wielding two acres of underground servers operating with machine learning, generates custom prices based in part on an individual shopper's attributes. These custom prices are influenced by a multitude of factors, including supply, demand, the customer's purchasing history, competitor pricing, and strategic initiatives. The retail giant also excels at understanding the psychology of pricing when assembling bundles, and it uses A/B testing exceptionally well to test price points.

The advanced tactical and psychological techniques in Amazon's pricing practices allow it to beat competitor pricing while making a higher margin on complementary products that are often bought together; this is a bundled-pricing model. The algorithm knows whether two or several items are often bought together, and it offers consumers the option to purchase these in addition to the original item they searched for. In this way, even if Amazon offers a lower price than competitors for the initial item, it is more likely to sell complementary items at a higher margin. For example, consider that Amazon may charge \$6.72 for a cube of orange sticky notes. Many consumers searching for orange sticky notes will be interested in other colors as well, so its algorithm suggests purchasing alternative colors at the same time. In this specific example, Amazon offers the a cube of aqua sticky notes for \$9.03, a 34 percent markup (see Exhibit). This combination of pricing, bundling, and recommendation is a powerful approach to pricing psychology.

Now imagine the same concept applied to airlines. Precise and detailed forecasts would allow a near-perfect calculation of an acceptable minimum price for the core ticket to capture the rest of a customer's spending on ancillaries. A proactive scrape of individual markets and testing of new price points would pinpoint the optimum market equilibrium. And targeted, customized offers generated with the help of advanced analytics would create additional revenue streams. Indeed, this concept is the future of airline RM.

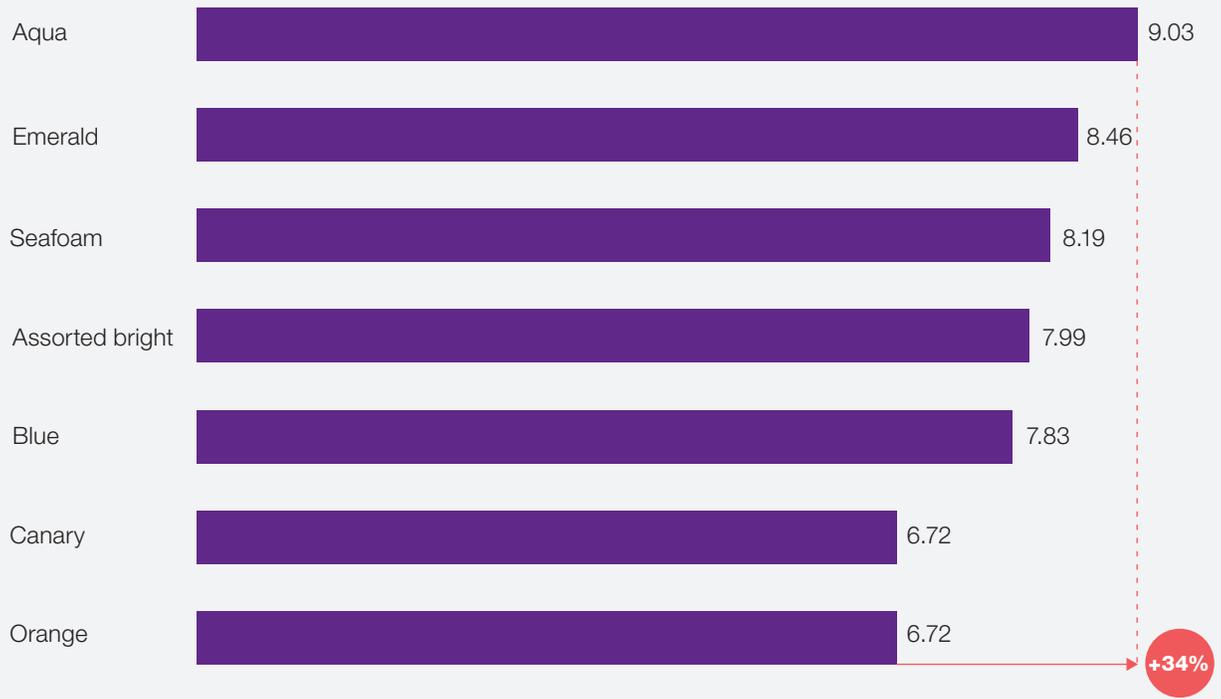
Customizing the travel customer offer

Maximizing total revenue depends on connecting a customer's total spending data with that customer's profile in the airline's system. Doing this allows for attribute-level customization, where airlines can segment customers into known groupings by location, demographics, and so forth. For example, if an airline knows that passengers flying from Miami, Florida, to Denver, Colorado, are more likely, on average, to check 1.9 bags at \$35 apiece, it can offer them a lower ticket price that it would offer to passengers flying from Denver to Miami, as they may be less likely to check baggage.

In theory, making these connections would also allow airlines to undertake passenger-level customization, which depends on even more granular data. By linking a passenger's frequent-flyer number to all purchases made before, during, and after the flight, for example, airlines can calculate exact profitability and the likelihood that the passenger will purchase ancillary products. This insight may then be used to offer personalized discounts on base fares.

Exhibit Through bundled pricing, Amazon achieves a higher margin on related products.

Sticky note pricing, USD



Source: Amazon.com. Prices dated October 23, 2017.

However, several complications with passenger-level personalization suggest that airlines may not yet reap an adequate return on such an investment. The same person may behave very differently when flying for business than when traveling with family or friends, for instance. And most airline customers are not frequent travelers; in 2015, the president of one major US airline revealed that 87 percent of the airline's passengers only flew on that airline once that year—but those passengers accounted for more than half of its revenue.¹ This reality suggests that airlines may not be capturing all necessary information on these travelers, and the utility of the information they do capture is inconsistent.

In other words, at this point in the customer journey, personalization may be useless. Customization, however, can be priceless. Take the cruise industry, which is already on the path to optimizing total revenue. Carnival Corporation has a portfolio of ten brands and has built a global database of customer wants and needs based on prior behavior, allowing the company to microsegment customers and build profiles for “lookalike” customers. This database enables each brand to target its marketing dollars and promotional dollars for those passengers who have the highest total revenue potential (both ticket and onboard sales). For instance, say “casino lovers” spend upward of \$120 a day in casino gambling during full days at sea, while “spa lovers” spend \$200 a day in spa services; marketers can create targeted offers to each segment based on total expected value. The company has also built into its pricing systems more aggregated estimates of total customer revenue by major customer source market. Airlines that can create similar tools and databases of attribute-level profitability could reap huge dividends.

A new paradigm for total revenue management

Taking this attribute-level customization and applying it across all revenue categories to create a smarter RM model will enable airlines to create a potentially infinite number of price points. The core ticket price will become just one input into the pricing engine alongside other factors such as a traveler's typical book-to-flight time, arrival time at airport, number of checked bags, size of party, and past ancillary purchases. All of these components will combine to create custom offers reflecting what individual travelers value most and are willing to pay for. We estimate that within three to five years this type of RM model could become table stakes. Some airlines, mainly low-cost carriers and start-ups, are already building these solutions. Legacy airlines, however, are in danger of falling behind.

Significantly, this paradigm shift does not mean giving up on the advancements in core ticket pricing and the systems, processes, and products achieved in recent years. As noted above, these advancements have produced significant value—but they are unlikely to provide similar returns for the future.

We have identified three steps that airlines should take to move toward a total RM model: adjust the organizational chart and break down silos to improve data visibility, hire the necessary data science and analytics expertise, and build a pilot project. The first two steps

¹ Bill Hethcock, “American Airlines CEO Doug Parker says carriers won't make the same mistakes they did a decade ago,” *Dallas Business Journal*, October 2015, www.bizjournals.com.

in particular will entail potentially dramatic cultural changes. Many airlines will need to focus on developing a more innovative, test-and-learn mind-set with a willingness to fail and an increased appetite and pace for development. We estimate that airlines committed to making the necessary changes can begin testing and enjoying the direct impact of revenue improvement within a year.

1. Adjust the organizational chart and break down silos to improve data visibility

Because many of the tasks performed by various departments require deep technical expertise, airlines have historically divided operating functions into silos. As a result, data is siloed as well. RM may oversee core ticket pricing and steering; marketing may manage onboard ancillary pricing; and sales may handle pricing with rental car, hotel, and other partners. A total RM model—one that brings together RM authority and then optimizes the entire process—will require vast amounts of input data from across the airline. In short, the current state of fractured data and authority is not conducive to total RM optimization.

Airline leadership must begin by revising the organizational chart to allow for communication and collaboration among the various departments—and likely reallocating authority of pricing for all products to a single leader. Of course, integrating teams that have historically worked as distinctly separate units will require a significant shift in mind-set.

2. Hire the necessary data science and analytics expertise

Once you have the data, you need someone who knows what to do with it. While no airlines are employing data scientists and developers at Amazon's level, most start-up and legacy airlines have hired technical talent for their RM functions. However, as mentioned above, no solution currently exists for optimizing total revenue in an airline. Airlines will need to find talent capable of building total RM functions from scratch, bringing the data together, and using that data to make better decisions. The airline also must have enough confidence in the new RM functions to override automated pricing decisions. A concerted effort will be required for the airlines to gain a competitive advantage by developing expertise in-house.

To succeed, airlines will need to look beyond employees who think in terms of traditional airline operations research; hiring data scientists from other industries (such as trading and retail) will be the key to unlocking the full potential of technology-enabled total RM optimization. While many airlines have the necessary talent to take the first step—building more heuristics that adjust prices outside the existing RM systems, then incorporating them into subsequent analyses—most will need to add more advanced analytical skills to their teams. People with expertise in writing bundled product algorithms, needs-based segmentations, and price-elasticity models, for example, will be critical to informing the right price decisions. Indeed, one major US airline recently hired its first machine-learning data scientist. Furthermore, relatively new analytical concepts such as artificial intelligence and machine learning could enable opportunities that were not possible even a few years ago. Models are now more capable of identifying patterns in data and predicting the future better than ever before.

3. Build a pilot project

Airlines will need to conduct testing and learn what works for their business model by measure of attribute-level customization, which will allow them to determine both the optimal price (that is, the highest price a customer with certain attributes is willing to pay) and how to offer it. For example, ancillary products can be offered as a bundle or a subscription. Using existing information on a customer's attributes—including travel persona (for example, business or leisure), purchase channel, advance purchase window, origin and destination, and number of passengers in a booking—allows airlines to create high-level segments and can go a long way toward differentiating their offers and optimizing total revenue.

One potential approach is to test a concept on a single market that carries a relatively low risk of diluting revenue. An airline might choose an off-peak period of a seasonal route to South America, for example, with a good mix of business and leisure passengers. To further minimize risk, they might only apply the test prices to a select number of flights.

A second approach might be for airlines to perform A/B testing, similar to what an online retailer might undertake. By performing tests in one part of a network and not in another, it's possible to compare results of the pilot against the control group to understand the impact and to continue to improve model performance.

The next step—collecting passenger-level data—will be a long-term process. While airline loyalty programs are indeed a rich source of passenger data, as mentioned above, the majority of revenue comes from infrequent travelers who are unlikely to participate. Eventually, airlines will need to engage the important subset of less-frequent travelers, rethink their loyalty programs, and broaden them to offer incentives tailored to specific traveler types.

For this and other reasons, airlines should first focus on building up their understanding of attribute-level data.



To gain and hold a competitive edge, airlines must change the way they approach and manage their revenue. Piecemeal surface changes will no longer suffice. While online retailers and the like offer a model for contemporary and efficient RM, airlines need to make some fundamental structural, software, and talent adjustments before this model is useful—and they need to run a pilot project to help work out the kinks. The fact is, airlines can no longer avoid focusing a critical eye on their revenue management. ■

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