

The Whole Package - Capitalizing on Bundle Deals for Large Groups

Our Mission: Did you know that you could save up to \$603 if you booked your hotel and flight as a package through Expedia? Unfortunately, if you are planning an extended family vacation, field trip, or company excursion, you will have to look elsewhere. While exploring the Expedia user data set, we noticed that package sales drop off steeply for groups larger than 6. After researching this issue further, we found multiple social media posts online complaining about the lack of larger group packages. The most common proposed solution? Go to another booking site. For example, Priceline.com, a direct competitor of Expedia, supports groups up to and including 8 people.

The Missing User Group: By characterizing this missing user group, we can better quantify potential gains. Further exploration of the data set revealed that groups purchasing packages are also 2 to 4-fold more likely to purchase high-quality hotels (i.e., more proximate, popular, and expensive hotels). In other words, there is evidence that larger groups of package-buying users are willing to spend more money. The destinations database, revealed that this group clusters towards high PC1 and PC2 values, with more than 50% in the upper quadrant, and only 10% in the lower quadrant. Inspection of feature variable contributions to the principal components shows that high PC1 suggests sites popular for expensive activities (e.g. indoor skiing), and high PC2 suggests sites in warmer, coastal climates. The combination supports the earlier finding that this population is interested in expensive, vacation activities. Identification of this user group presents an opportunity for more precisely targeted advertising. Since advertising generated \$594 million in revenue in 2015¹, more discriminating advertisements constitute another significant benefit from this analysis.

Benefits for Hotels: Packaged orders by large groups are also important to Expedia's partner hotels. Such offers constitute a significant fraction of the Expedia bookings placed, especially at unbranded hotels. Of the 179,647 hotels, 20,901 have at least 1 Expedia package booking: ~60% are branded, and ~40% are unbranded. Although these unbranded hotels are the minority, package deals matter more to them: 14.4% of booked unbranded hotels have over 90% of their bookings as packages, while just 4% of booked branded hotels get over 90% of their bookings as packages. 76% of booked unbranded hotels have over 10% of their bookings as packages, while just 58% of booked branded hotels get over 10% of their bookings as packages. Thus independent hotels are likely to be prime package partners as their lack of partnerships makes Expedia a significant referral channel for them.

Potential Revenue: To quantify potential hotel revenues, we created a linear model to extrapolate the fraction of large groups (more than 6 total travelers) that would have booked a package. We use the total booked counts as a conservative estimate of the total number of users that would have booked, had packages been available. Using these values, we compute the number of packages that Expedia would have sold, and the number of individuals that would have been booked. This portion of the user base is multiplied by \$11.21 per individual (\$22.43 per room and 2 individuals per room) and scaled by Expedia's actual user base. \$22.43 was computed by taking total Expedia annual profits (\$6.6 billion), multiplied by the fraction from hotel revenues (69%), divided by total booked room-nights (203 million)¹. Our total amounted to over **\$2.89 million USD** in potential revenue per month.

Qualifications: Our calculation relies on a number of assumptions which may affect the result. First, we assume that all bookings last exactly 1 night, when many bookings will last longer (underestimate). Second, we ignored all revenue from flight sales (underestimate). Third, we assume that profits from large groups are not divided up into smaller groups (overestimate). Fourth, we assume that the given dataset is roughly representative of the actual user data, despite the weighted sampling procedure.

In summary: The restriction on traveler size for bundled deals is unpopular among customers, and may damage revenues to Expedia and its partner hotels. Policy revisions may ensure that Expedia can continue to best meet its mission of providing quality service to its customers and partners.

¹ [Expedia 2015 Q4 Investor Report](#)