Search, OTAs, and Online Booking: An Expanded Analysis of the Billboard Effect

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Search, OTAs, and Online Booking: An Expanded Analysis of the Billboard Effect

Abstract
Replicating and expanding an earlier study, this report confirms and quantifies the so-called billboard effect that occurs when online travel agents (OTAs) include a particular hotel in their listings. An earlier study, based on four JHM-owned hotels, found that a hotel's listing on Expedia increased total reservation volume by 7.5 to 26 percent depending on the hotel. This number excluded reservations processed through the OTA itself. This larger and more exhaustive study analyzes the billboard effect based on booking behavior related to 1,720 reservations for InterContinental Hotel brands for the months of June, July, and August of three years (2008, 2009, and 2010). The analysis determined that for each reservation an IHG hotel receives at Expedia, the individual brand website receives between three and nine additional reservations. Although these reservations are made through "Brand.com" (the individual brand's site), they are directly created or influenced by the listing at the online travel agent. The study also gained an indication of the amount of surfing time spent by would-be guests who are investigating and studying potential hotels to book. Some travelers recorded as many as 150 searches, but that was exceptional. The more typical activity was still considerable: the average consumer made twelve visits to an OTA's website, requested 7.5 pages per visit, and spent almost five minutes on each page.

Keywords
hotels, online booking, online travel agents (OTAs)

Disciplines
Business | Hospitality Administration and Management

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Search, OTAs, and Online Booking: An Expanded Analysis of the Billboard Effect

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by Chris Anderson, Ph.D.
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Replicating and expanding an earlier study, this report confirms and quantifies the so-called billboard effect that occurs when online travel agents (OTAs) include a particular hotel in their listings. An earlier study, based on four JHM-owned hotels, found that a hotel’s listing on Expedia increased total reservation volume by 7.5 to 26 percent depending on the hotel. This number excluded reservations processed through the OTA itself. This larger and more exhaustive study analyzes the billboard effect based on booking behavior related to 1,720 reservations for InterContinental Hotel brands for the months of June, July, and August of three years (2008, 2009, and 2010). The analysis determined that for each reservation an IHG hotel receives at Expedia, the individual brand website receives between three and nine additional reservations. Although these reservations are made through “Brand.com” (the individual brand’s site), they are directly created or influenced by the listing at the online travel agent. The study also gained an indication of the amount of surfing time spent by would-be guests who are investigating and studying potential hotels to book. Some travelers recorded as many as 150 searches, but that was exceptional. The more typical activity was still considerable: the average consumer made twelve visits to an OTA’s website, requested 7.5 pages per visit, and spent almost five minutes on each page.
Chris K. Anderson, Ph.D., is an assistant professor at the Cornell School of Hotel Administration (cka9@cornell.edu). Formerly on faculty at the Ivey School of Business in London, Ontario, his main research focus is on revenue management and service pricing. He actively works with numerous industry types in the application and development of RM, having worked with a variety hotels, airlines, rental car, and tour companies as well as numerous consumer packaged good and financial services firms. He serves on the editorial board of the Journal of Revenue and Pricing Management and is the regional editor for the International Journal of Revenue Management.
As a rule, when it comes to online distribution, hotels would prefer to sell rooms through their own websites, and they usually view third-party websites, known as online travel agents (OTAs) as a competitor in terms of distribution—even though OTAs are instrumental in filling rooms that might otherwise go unsold. The research presented here explores another, often unmentioned facet of the relationship between hotels and OTAs. In a phenomenon called the billboard effect, the fact that a hotel is listed on an OTA has the effect of pushing up bookings on the hotel’s own website. In this report, I review a small test of this effect that was published as an earlier CHR report, and then I present a considerably larger study, which confirms that hotels gain additional reservations on their own websites when they are listed on online travel sites.1

First, let’s review the initial study that delineated the billboard effect. This phenomenon involves the marketing or advertising benefits that hotels receive by being listed on the results page for an online travel agent like Expedia.com or priceline.com. Since the OTAs have a considerable reach and a broad offering of hotels to choose from, consumers use these third-party websites to research a hotel's location, brand, rates, and service experience. Using hotels listed on Expedia as a test case, the first study was a pseudo experiment intended to estimate the impact of an Expedia listing on bookings through a hotel’s own website. During October, November, and December 2008, with the assistance of the hotel firm and Expedia, we manipulated the listing of four JHM Hotels on Expedia.2 The test involved one independent hotel and three branded properties.

During the three-month period, the properties were cycled on and off the Expedia.com listings. That is, we displayed a particular hotel on Expedia and then did not display it there. Each hotel's cycle lasted from seven to eleven days. When properties were displayed on Expedia.com, they were displayed on the first results page. When a property cycled off, it could not be found anywhere on Expedia.com, even if someone specifically searched for it. At the completion of the study each property had spent 40 days displayed on Expedia and 40 days not displayed. We tallied all the reservations for any stay at each hotel that was booked during the experimental period. As you see in Exhibit 1, the bookings were divided according to whether the hotel was displayed or not. In an effort to ensure confidentiality we have disguised the names of the four properties involved in the study.

Exhibit 1 shows the comparison of the average number of daily reservations when the hotel was off Expedia to when it was on the site. The bookings listed are only those that came through the hotel's website, because the goal of that study was to measure the impact of the OTA on reservation volume on “Brand.com” and not the total reservations coming through the OTA. When the hotel properties were listed on Expedia.com, we excluded the bookings coming through the OTA. Consequently, the reservations summarized in Exhibit 1 are all non-Expedia reservation volumes. Based on this methodology, I concluded that listing on Expedia created a lift of between a 7.5 and 26 percent on non-Expedia reservations, depending on the hotel.

The wide range of lift figures was probably a result of noise in the data, as I explain in a moment. Branded Hotels 1 and 2 are located in the same city and have an average booking increase of 8.3 percent. Hotel 1 recorded an average daily increase of 2.8 reservations when displayed on Expedia.com (a 7.5-percent increase), while Hotel 2 averaged an increase of 5.1 daily reservations during its “on” phase; a rise in reservations of 9.1 percent. Branded Hotel 3 had an average increase of 4.9 daily reservations when it was displayed (a 14.1-percent increase), and the Independent Hotel recorded an average increase of 5.9 daily reservations during its on phase—a 26-percent increase.

**Noisy data.** Let's look at the issue of "noise" in the data, because I must point out that the test clarity is a particular problem for Branded Hotels 1 and 2. While it’s true that they are the only hotel representing their brand in the particular city, there are other hotels in their chain family within close proximity, which could cause “static” for the OTA billboard effect. The hotel could benefit from a sort of billboard effect from its own brand site. To use Marriott as an example, the hotel in question may be the only Courtyard in the vicinity, but some other brand operated by Marriott may exist nearby (e.g., Fairfield Inn). The actual situation is that seven other same-chain-family hotels operate within 18 miles of Branded Hotels 1 and 2. If a customer looking to stay in this particular city happened to

<table>
<thead>
<tr>
<th>Property</th>
<th>Average Daily Reservations</th>
<th>Percentage Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ON Expedia</td>
<td>OFF Expedia</td>
</tr>
<tr>
<td>Branded Hotel 1</td>
<td>39.4</td>
<td>36.6</td>
</tr>
<tr>
<td>Branded Hotel 2</td>
<td>54.8</td>
<td>49.7</td>
</tr>
<tr>
<td>Branded Hotel 3</td>
<td>39.1</td>
<td>34.2</td>
</tr>
</tbody>
</table>

Note: Percentage increase represents additional reservations through the “Brand.com” site during OTA listing, but excludes OTA reservations. Reservation period extended for 80 days in the fourth quarter of 2008.

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2 For background on JHM see www.jhmhotels.com.
search on Expedia for hotels in nearby locations, that search would show the seven family hotels. Even more of the chain’s brands hotels show up if the consumer includes a larger area in the search. After seeing all those properties from the same brand family, the consumer potentially could visit “Brand.com” (the chain’s website) and book one of the properties in this study, even though those particular hotels were not listed on Expedia.

The test is a little cleaner for Branded Hotel 3, because only three chain family properties operate within 20 miles of this hotel. Thus, the statistical noise from searches for those other hotels is lower. The situation of the Independent Hotel creates the cleanest test, since there is little way to argue that a reservation at the hotel could have been influenced by Expedia at times when the hotel was not listed there, and there are no sister brands to confound the data.

So it is that the incremental reservation volumes appear to decrease as the experiment becomes less “clean.” This involves the potential influence from searches of related hotels. Specifically, for the independent hotel there is little chance that when someone booked the hotel during an Expedia off phase that booking would be affected by an Expedia listing, other than a booking occurring after some delay beyond the shopping period. That might occur if the customer shopped on Expedia at one point, but kept track of the property and made a reservation a few days later even though the property was no longer on Expedia. On the other hand, the branded properties could experience bookings even when they’re not listed on Expedia as a result of a search that took the customer to the brand’s site, where a list of neighboring related properties could be found. So, in essence, even when the hotel was in the Expedia off phase, the OTA can be said only to be partially off, and it still is influencing reservations.

**Billboard Effect, Clarified**

For this expanded study, I analyzed a dataset provided by comScore. This firm has changed the face of digital marketing and media measurement by solving the challenge of accurately measuring worldwide consumer behavior through its proprietary panel design, patented data capture technology, online data retrieval network, and Unified Digital Measurement™ methodology. Central to most comScore services is the comScore panel, the largest continuously measured consumer panel of its kind. With approximately two million consumers worldwide under continuous measurement, the comScore panel uses a sophisticated methodology that is designed to accurately measure people’s digital activities. This massive information network delivers one of the highest quality, most comprehensive views of internet browsing, buying, and other activity, in both digital and offline environments.

Our comScore dataset consists of 1,720 hotel reservations at the InterContinental Hotels Group (IHG) websites for Candlewood Suites, Crowne Plaza Hotels, Holiday Inn, Hotel Indigo, InterContinental Hotels, and Staybridge Suites. The study occurred during June, July, and August of 2008, 2009, and 2010. Owing to the nature of the comScore data, we have all travel-related website visits (e.g., TripAdvisor.com, Orbitz.com, LasVegas.com) and travel-related searches (on Google, Yahoo, and Bing) for 60 days prior for each of these reservations. Thus we are able to track which websites consumers visited prior to making a reservation at the IHG sites and what sort of travel-related research the consumers were performing. As one would expect, consumers who make reservations online also spend a great deal of time online researching those transactions. Almost 75 percent of consumers who booked at the Brand.com website visited an OTA prior to making the reservation, with almost 83 percent performing a search (on Google, Yahoo, or Bing) and approximately two-thirds performing both a search and visiting an OTA.

Exhibits 2 and 3 display the relative frequency distributions of the number of searches and travel-related site visits. As can be seen from the figures, some consumers spend
Exhibit 3

Distribution of travel-related site visits

Note: Based on search activity by comScore panel representing 1,720 hotel reservations in June, July, and August of 2008, 2009, and 2010.

Exhibit 4

OTA site behavior by brand scale, average behavior per IHG.com booking

<table>
<thead>
<tr>
<th>Brand Scale</th>
<th>Pages per visit</th>
<th>Minutes per visit</th>
<th>Number of visits</th>
<th>Percentage of Reservations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candlewood Suites</td>
<td>9.1</td>
<td>5.5</td>
<td>6.2</td>
<td>5.9</td>
</tr>
<tr>
<td>Crowne Plaza Hotels</td>
<td>9.1</td>
<td>5.4</td>
<td>13.9</td>
<td>9.0</td>
</tr>
<tr>
<td>Holiday Inn</td>
<td>7.7</td>
<td>4.4</td>
<td>11.4</td>
<td>80.1</td>
</tr>
<tr>
<td>Staybridge Suites</td>
<td>8.1</td>
<td>4.7</td>
<td>9.9</td>
<td>3.9</td>
</tr>
<tr>
<td>Hotel Indigo</td>
<td>7.6</td>
<td>4.3</td>
<td>23.7</td>
<td>0.6</td>
</tr>
<tr>
<td>InterContinental Hotels</td>
<td>5.9</td>
<td>3.4</td>
<td>28.6</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Exhibit 5

OTA booking behavior versus supplier.com

<table>
<thead>
<tr>
<th>Brand Scale</th>
<th>IHG.com Percentage reservations</th>
<th>Expedia.com Percentage reservations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candlewood Suites</td>
<td>5.9</td>
<td>5.7</td>
</tr>
<tr>
<td>Crowne Plaza Hotels</td>
<td>9.0</td>
<td>13.8</td>
</tr>
<tr>
<td>Holiday Inn</td>
<td>80.1</td>
<td>73.2</td>
</tr>
<tr>
<td>Staybridge Suites</td>
<td>3.9</td>
<td>1.6</td>
</tr>
<tr>
<td>Hotel Indigo</td>
<td>0.6</td>
<td>0</td>
</tr>
<tr>
<td>InterContinental Hotels</td>
<td>0.6</td>
<td>5.7</td>
</tr>
</tbody>
</table>

enormous time online, performing as many as 150 searches or visiting travel related sites in excess of 50 times. As an aside, roughly half of the travel searches are not really research related, but are instead merely a way for the customer to locate a particular website. Consumers are typing Marriott or American Airlines into the search window and then they click on the search result rather than directly typing in Marriott.com. If we focus on OTAs only, on average consumers make 12 visits to an OTA’s website, requesting 7.5 pages per visit and spending almost 5 minutes per visit. This means that on average would-be hotel guests spend an hour at OTAs viewing about 90 pages of content.

We can break down OTA behavior across the different chain scales, since IHG operates vertically differentiated brands. Exhibit 4 summarizes OTA site behavior according to the chain scale. As over 80 percent of the bookings are at Holiday Inn, its behavior is similar to that of the averages presented earlier. What is interesting to observe from Exhibit 4 is that consumers of the more up market hotels (i.e., InterContinental, Hotel Indigo, and Crowne Plaza Hotels) tend to spend more time researching hotel purchases at the OTAs, as they both make more visits and request marginally more pages per visit.

We augmented the IHG comScore sample with comScore panel consumers who made a reservation at an IHG hotel through Expedia during the same sample period (that is, June, July, and August, 2008, 2009, and 2010). Participants in the sample made 122 reservations for IHG hotels through Expedia.com during the study period. Exhibit 5 illustrates the chain scale distributions of these reservations at both the Brand.com site as well as the OTA. Note that it appears that the OTA customers move slightly up market, perhaps owing to their increased search behavior of high chain scale properties as summarized in Exhibit 5. This is seen in the fact that Crowne Plaza and InterContinental Hotels have a larger share of transactions at the OTA than on the brand websites.
Similar to the JHM Hotels experiment, we can use the comScore dataset to help evaluate the billboard effect. Specifically, we focus on the Brand.com reservations by guests who visited Expedia prior to booking at the brand website, as summarized in Exhibit 6. As that table indicates, almost 62 percent of those who booked at one of the brand’s websites visited Expedia prior to that reservation. For almost 22 percent of consumers who visit Expedia, that is the only OTA they visit. Those consumers do not go on to check Orbitz, priceline.com, or Travelocity. Let’s apply these fractions to the 1,720 hotel room bookings (unrounded, that is, 61.8% who visited Expedia and then booked on Brand.com, or 21.5% who went to Expedia only) and divide the resulting product by the total number of bookings that the comScore sample made through Expedia (that is, 122 reservations). The resulting ratios are 8.7 to 1 and 3.0 to 1. These ratios indicate that for each reservation at an IHG-related hotel there is a range of 3.0 to 8.7 that are influenced by being listed at the OTA. Specifically, if the hotel had not been listed at Expedia, one could reasonable expect that the 21.5 percent of consumers who visited Expedia (and no other OTA) would have booked a non-IHG property. Likewise, say that someone in the 61.8 percent who booked with a Brand.com site after visiting Expedia actually did not visit Expedia. That person may have still seen the property listed on Priceline or Travelocity and then visited the supplier to make the reservation. Keep in mind that these ratios (3.0:1 and 8.7:1) are conservative estimates because they only record electronic bookings. Those numbers don’t consider consumers within the comScore sample that visited an OTA and then made a hotel reservation via telephone.

It is interesting to try to compare the billboard effect as measured via the JHM experiment with that measured via the comScore panel. In the JHM experiment hotels we saw a 7.5- to 26-percent increase in reservations from listing at the OTA. If we assume a hotel was running about 60-percent occupancy (which is the approximate U.S. average) and that the billboard effect as measured via the JHM experiment is around 20 percent, then the hotel saw reservations increase from 50 percent to 60 percent as a result of listing at the OTA. If we assume the OTA accounts for 5 percent of the hotel’s reservations, then the ratio of OTA-influenced bookings is 3.33 (that is, 10% (60%-50%) divided by 3% (.05 x 60%). This approximate 3-to-1 ratio is consistent with that measured via the comScore panel. As one decreases the Expedia share of reservations or increases the billboard effect, this ratio increases, and the reverse is true (increasing the Expedia share of reservations or decreasing the billboard effect, decreases the ratio of OTA-influenced bookings).

### Summary

One reason for offering this follow-up study to the JHM Hotels experiment involves an effort to further generalize and confirm the potential size of the billboard effect. Consistent with the early billboard study, where we saw lifts of 7.5 to 26 percent in total reservations from listing on Expedia, here we see that for each reservation at the OTA, 3 to 9 reservations at the brand’s website are directly influenced by listing at the OTA. The consistency of the studies adds further validity to the size of the billboard effect. One lesson here for hotel firms is that the magnitude of the billboard effect indicates the effectiveness of OTAs in marketing to consumers and educating them on product assortment and characteristics. Additionally, the billboard effect leads to an effective decrease in the cost of OTA transactions. Given the additional bookings that clearly result from being listed on the OTA, a hotel firm can average the margins paid to OTAs four or more reservations. Thus, a 30-percent commission would effectively be reduced to single digits.
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