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CENTER FOR HOSPITALITY RESEARCH

The Billboard Effect:

Still Alive and Well

By Chris K. Anderson and Saram Han

EXECUTIVE SUMMARY

As a follow-up on two earlier studies, this report confirms the so-called billboard effect on demand that occurs when online travel agents (OTAs) include a particular hotel in their listings. Even though many guests book directly with the hotel brand, this study's findings are similar to those of earlier studies which showed that being listed on an OTA site increased reservations through the hotel brand's site. The findings in the report presented here underscored consumers' reliance on websites when researching and booking their rooms, although non-direct channels still have some influence in lodging purchase decisions. In determining which web-based marketing efforts produce the best results, hotel operators should make sure their online presence is easy to find, is attractive, and stands up to the competition. To better understand changes in consumer online behavior this report revisits aspects of the billboard effect through use of publicly available data sources. Contrary to research suggesting that the billboard effect is dead, this study's results show that reports of its demise may have been exaggerated.

ABOUT THE AUTHORS

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The Billboard Effect: Still Alive and Well

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Changes in the online travel market are causing hotels to rethink their relationships with online travel agencies (OTAs) and to take a closer look at the impact on bookings from listing their properties with OTAs. One outcome of being listed on an OTA is additional bookings on the brand's own website, a phenomenon that co-author Chris Anderson labeled the billboard effect. In a 2009 study, Anderson presented an experiment in which a group of hotels was listed and then removed from Expedia.com in alternate weeks. This test found that, compared to being hidden, being listed on the site increased reservations 9 percent to 26 percent (above transactions that occurred at Expedia).[1] That was followed by a 2011 study examining consumers' online pre-purchase research that found about 75 percent of consumers who made reservations with a major hotel brand had visited an OTA in advance of booking directly with the brand.[2] In this report we show that the ability of a second-party channel to influence an eventual reservation may be lower now, but the billboard effect still occurs, since many consumers visit an OTA prior to booking.

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[1] Anderson, CK. "The Billboard Effect: Online Travel Agent Impact on Non-OTA Reservation Volume," *Cornell Center for Hospitality Research Report*, Vol. 9 No. 16. http://scholarship.sha.cornell.edu/chrpubs/2/

[2] Anderson, CK. "Search, OTAs, and Online Booking: An Expanded Analysis of the Billboard Effect," *Cornell Center for Hospitality Research Report*, Vo. 11 No. 8. http://scholarship.sha.cornell.edu/chrpubs/4

Exhibit 1

Domain visitation (60 days prior to reservation)

Booking Channel	Reservations	Site Visitation Prior to Reservation				
		OTAs	Hotel Sites	Web Search	TripAdvisor	Other Meta
OTA	2,776		48%	68%	39%	33%
Direct	2,317	65%		66%	34%	21%

Note: Sample OTAs include Expedia.com, Hotels.com, and Booking.com. Sample Hotel sites include Hilton.com, Marriott.com, and IHG.com. Searches include searches at Google, Yahoo, and Bing. Sample Meta sites include Kayak.com, Trivago. Com, and GoSeek.com.

Exhibit 2

Average number of visits per reservation (60 days prior to reservation)

Booking Channel	Reservations	Site Visitation Prior to Reservation				
		OTAs	Hotel Sites	Web Searches	TripAdvisor	Other Meta
OTA	2,776	8.4	3.4	4.6	2.9	2.4
Direct	2,317	7.2	6.5	5.1	4.1	2.3

A primary reason for this change is consolidation and innovation among the online travel firms. Expedia has acquired both Travelocity and Orbitz, while Priceline acquired Kayak and Expedia and also took a major equity position in Trivago. Much of this merger activity has been allowed (from a competition standpoint) by the moves of Google and TripAdvisor to become meta OTA sites, as are Kayak and Trivago, and their continued evolution to becoming full fledged OTAs that offer facilitated direct booking. There has also been an upsurge in hotel-OTA interactions, with several large hotel brands launching direct booking campaigns. All of this activity has encouraged research findings that imply that the billboard effect is dead. This conclusion stems from the rapid growth of the two major OTAs (Expedia and Priceline), which now take a larger share of online transactions (and transactions in general). To understand changes in consumer online behavior we revisit aspects of the billboard effect through use of publicly available data sources.

Pre-Purchase Web Search, Social, and OTA Visitation

In this study we use a randomly selected sample of more than 50,000 consumers from a panel of over two million online consumers maintained by comScore, which tracks all of the sample members' 2015 online behavior.[3] In our analysis we focus on some 13,000 travel-related reservations (including air, rental car, and hotel). A total of 5,093 hotel reservations were made by the sample: 54.5 percent (2,776) of these reservations were made at OTAs and the remaining 2,317 (45.5 percent) were made directly at hotel websites.[4] Using domain level information for each website visited prior to the hotel reservation, we focus on travel related behavior for 60 days prior to purchase. Because comScore only provides domain level information (e.g., Hilton.com), we have information on which domains consumers visited (and how often), but we don't necessarily know which pages or content consumers focused on.[5] We do know whether they visited web search related sites (Google, Yahoo, or Bing), but we don't know which keywords they searched. For web search related visits, we do know which site they went to after visiting the search engine. If this next site was a travel related domain, we can infer that this was a travel related search. Exhibit 1 summarizes the percentages of hotel bookers who visited travel related sites. Exhibit 1 is separated into two rows: the first row represents consumers who book hotels at OTAs and the second row

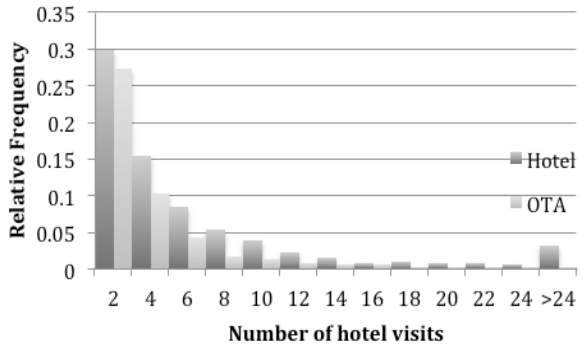
[3] The comScore panel used only includes non-mobile, desktop panelists.

[4] We focus only on hotels that have at least 30 days pre-purchase information (reservations made in February onwards) and those which there was a gap of at least 30 days followi=ng any prior travel related reservations.

[5] One methodology to address this issue is eye tracking. See: Breffni Noone and Stephani K.A. Robson, "Using Eye Tracking to Obtain a Deeper Understading of What Drives Online Hotel Choice," *Cornell Hospitality Report*, Vol. 14, No. 8 (2014), Cornell Center for Hospitality Research.

Exhibit 3

Distribution of visits to hotel websites prior to booking via a hotel site vs. an OTA



represents consumers booking directly at hotel websites. The exhibit summarizes the percentage of these consumers who visit OTAs, hotel websites and search engines, as well as sites such as TripAdvisor and meta sites (e.g., Kayak, Trivago, GoSeek) within 60 days prior to making a hotel reservation.

The percentages in Exhibit 1 are reasonably consistent with those from our 2011 study.[6] At that time, about 75 percent of consumers who booked directly with a hotel online visited an OTA prior to purchase (compared to 65 percent in this study), while 83 percent of consumers performed a web search in the earlier study (compared to 66 percent in this study).

As shown in Exhibit 2, the average number of visits per reservation is not radically different for those who booked on the OTA, compared to those who booked with the hotel brand directly. In terms of web visits, the online research behavior is consistent between OTA bookers and hotel direct bookers, but hotel direct bookers visited TripAdvisor about 33 percent more often than OTA consumers. On average, hotel direct bookers make about twice as many visits to hotel websites (6.5) as OTA bookers (3.4). However, the distribution of these visits versus just the average (see Exhibit 3) shows that those two groups' behavior is fairly consistent. That is, those OTA bookers who visit hotel websites tend to visit about the same number as those who book direct. The average shown in the exhibit is smaller because only about half of the OTA bookers visit hotel websites prior to booking at the OTA.

Exhibits 4, 5, and 6 show (on the x-axis) the distributions of the number of days before booking that consumers perform web searches, visit TripAdvisor, or go to an OTA. (The six y-axes, showing relative frequency, are on the same scale, allowing a comparison of direct bookers with those using OTAs.) The figures are noteworthy as they indicate that web search activity (Exhibit 5) is happening fairly consistently during the entire 60-day research phase (although it gradually picks up just before the booking), whereas visits to TripAdvisor (Exhibit 5) and OTAs (Exhibit 6) tend to be intensive just prior to the booking. For OTA visitation prior to OTA booking (left panel of Exhibit 4), we exclude the OTA visit during which the transaction occurred. The intensity of TripAdvisor and OTA visitation prior to booking indicates that these travel sites may be greatly influencing the purchase decision.

This observational data indicates that consumers remain actively engaged in researching their hotel stay. Review sites and OTAs are critical components of the purchase decision, although consumers rely less on search engines compared to our 2011 report, probably as a result of OTA consolidation and increased familiarly with the internet.

While Exhibits 3, 4, and 5 illustrate the role travel sites play in online research, in Exhibit 7 we focus on the start of that travel research. Exhibit 7 lists the travel related sites where the consumers' research phase was initiated in advance of the hotel reservation. It summarizes the percentages of first visits occurring at meta sites, Trip Advisor, hotel sites, OTAs, and web searches across all consumers as well as separated into OTA versus direct booking channels. It indicates that web search and Trip Advisor share similar percentages as the initial site for both OTA and direct bookers, while OTA bookers have almost twice the frequency of meta and OTA visitation as direct bookers.

Implications for the Billboard Effect

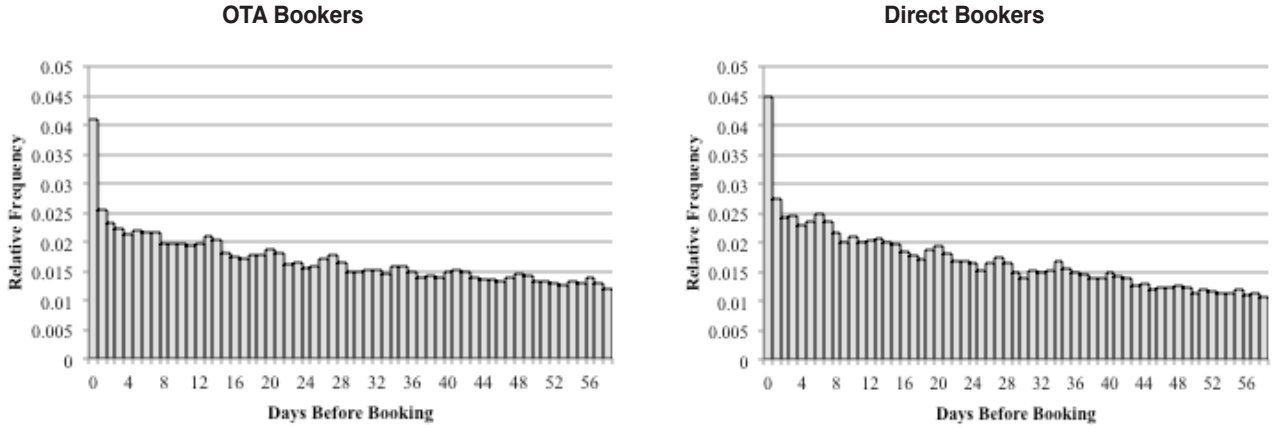
Research conducted since our 2009 report reflects new opinions regarding the billboard effect. Estis Green and Lomanno contend that the effect is considerably less prevalent than indicated earlier.[7] They summarize work done by P.K. Kannan at the University of Maryland describing online consumer behavior using comScore data from 2012 and 2014 (the same data used here, but from different years). For ease of discussion we show a reproduction of results from this study in Exhibit 8. The key insights from this exhibit are the low probabilities of consumers moving from an OTA (labeled as an intermediary) to a hotel website (9.3 percent for 2012 and 7.0 percent for

[6] The sample in 2011 included hotel direct bookings for July and August of 2008, 2009, and 2010, with data provided by comScore.

[7] Estis Green, C and MV Lomanno. 2016. "Demystifying the Digital Marketplace: Spotlight on the Hospitality Industry," *HSMAI Foundation.*

Exhibit 4

Time before booking of web searches



2014) versus the high probabilities of consumers moving from OTA to OTA (90.7 percent in 2012 and 93.0 percent in 2014). This indicates that it is unlikely that awareness is created at an OTA with consumers then switching sites and booking with hotels directly (as suggested by the billboard effect). One detail that receives less attention in the Estis Green and Lomanno report is that these switching probabilities are for consecutive website visits (from t-1 to t in Exhibit 8) and not for the consumer's entire research process. As summarized in Exhibit 2, consumers who visit OTAs, prior to booking direct with hotels do so 7.2 times on average, not once. We can create an approximation of the 9.3 and 7.0 figures from Exhibits 1 and 6. Exhibit 1 shows that 65 percent of consumers booking directly with the hotel visited an OTA prior to booking direct, and Exhibit 6 (right-hand panel) shows that about 18 percent (of this 65 percent) visit an OTA on the day of the booking (day 0 on x-axis of Exhibit 6), the product of these two being 11.7 percent. That figure is higher than the 7.0 or 9.3 percent as it ignores other (non-OTA) travel site visits on the same day of the booking that might have occurred between the OTA visit and the hotel direct booking. This estimate of the OTA impact (like any click-to-click switching probability) ignores all the other OTA visits in Exhibit 6 (those not on the same day as the booking) and provides a conservative estimate of the effect.

To illustrate the potential impact of the 7.2 (on average) OTA visits consider a consumer at an OTA who only makes two transitions (i.e., moves to two websites). Using the 2014 results from Exhibit 8 there is a 7 percent chance that she moves to a hotel website and 93 percent chance she moves to or remains at an OTA. Following that click she could also move to a hotel or an OTA. Exhibit 9 shows all the possible outcomes of a consumer making two transitions, adding the transitions from hotel (H) website to hotel website (60 percent chance) as well as hotel to OTA transitions (40 percent). Because of these two transitions a consumer who started at a OTA has a 10.71 percent (0.042+0.0651) chance of ending up at the hotel website, up from the original 7 percent. So the probability that a consumer ends up booking directly at a hotel, given she was at an OTA earlier, depends upon how many of these website-to-website transitions are made. This probability converges at about 15 percent after about four transitions. The 15 percent (and the 7 percent) are path independent transition probabilities, which means the chance of a consumer moving from Expedia.com to Hilton.com is the same whether she is starting her travel research or is almost finished and knows where she wants to stay.

We can't read too much into these transition probabilities as they are simply click-to-click behavior and don't include the entire search process. In fact, as noted by Estis Green and Lomanno there is a stronger effect of consumers moving to OTAs from hotel direct sites versus the opposite, with a single click probability of 40 percent of consumers clicking over to OTAs from hotel direct sites.

Another way to examine these switching probabilities is to consider them in aggregate across the entire research process versus from click-to-click actions. In our sample of 5,093 hotel reservations, 4,273 of these consumers visited OTAs, with 2,776 booking at OTAs and the remaining 1,497 booking direct with hotels (see Exhibit 10). This indicates 35 percent of hotel room purchasers who visited OTAs eventually booked direct. Our sample also shows 232 customers who visited OTAs but booked direct with hotels without visiting hotel websites prior to the purchase. This 5.5 percent of the

Exhibit 5

Time before booking of TripAdvisor visitation

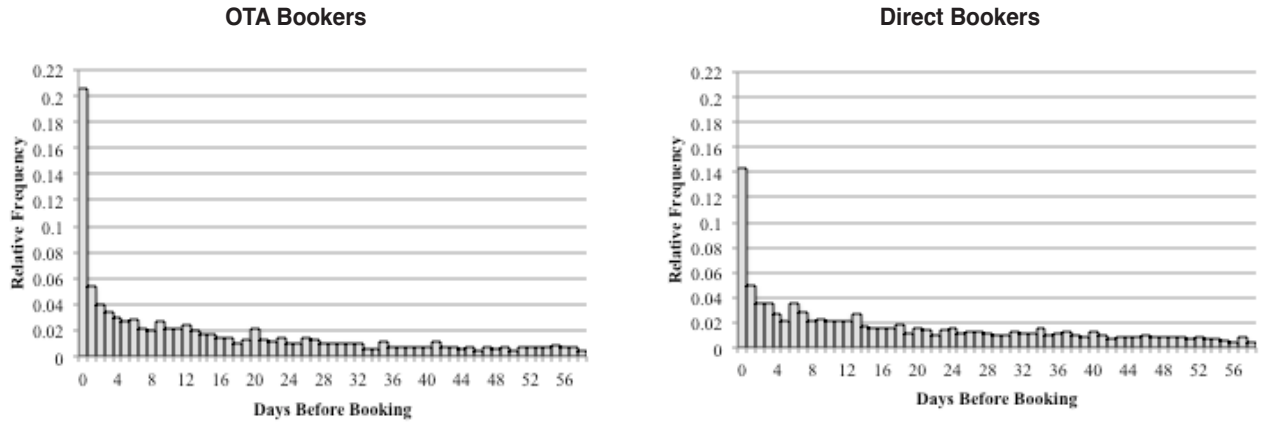
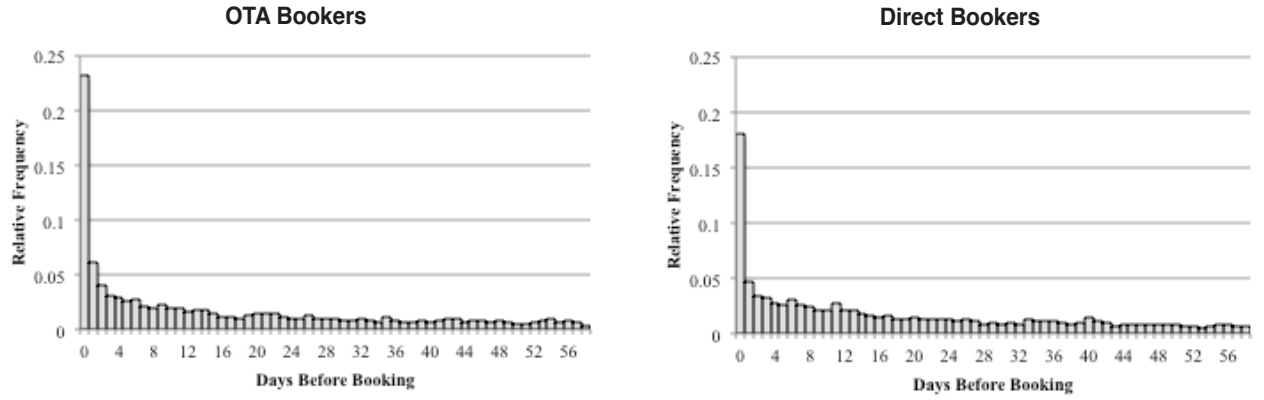


Exhibit 6

Time before booking of OTA visitation



sample represents unique shoppers, as they never visited hotel websites until the purchase moment. They are also active travel researchers, making an average of 14.1 visits to travel related sites in the 60 days prior to booking. The 5.5 percent figure serves as the low end of this switching behavior and the 35 percent figure serves as a high end estimate, with the billboard effect falling somewhere in between. Exhibit 11 provides a summary of billboard effect estimates, comparing the original estimate from our 2009 report with the current estimate, as well as an estimate based on step-to-step transition probabilities and steady state transition probabilities from Estis Green and Lomanno.

One aspect of the comScore data is the need to code URLs into the appropriate travel categories, which requires understanding of the travel industry. During the coding of URLs into our specific categories of interest (namely, OTA, meta, TripAdvisor, hotel direct, and web search), we coded major brand sites (e.g., marriott.com, hilton.com) as hotel direct and also coded independent hotel websites and hotel specific sites as hotel direct. Distinct from the earlier study we also subdivided intermediaries into a series of categories (i.e., OTAs, web search, meta, TripAdvisor, airline direct). The result of this coding shows considerably different site share than that reported in the study summarized by Estis Green and Lomanno. If we focus on just hotel direct and OTAs we find 34.5 percent of these visits are to hotel direct and 65.5 percent to OTAs, compared to their 2014 numbers of 15.2 percent to hotel direct and 84.8 percent to intermediaries. Similarly, this coding shows 16 percent of consumers visited hotel direct only and did not visit OTAs, versus the 7 percent reported in Estis Green and Lomanno, and 28.5 percent visiting OTAs only (versus 64 percent) and 55.5 percent

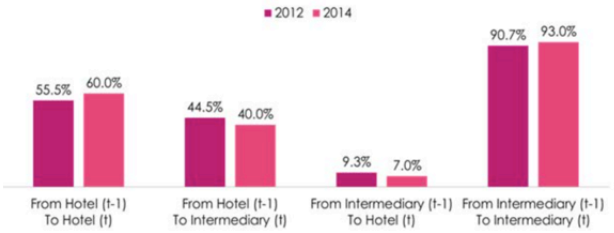
Exhibit 7

Domain visitation—first visit distribution

Visitation Site	Booking Channel		
	All	OTA	Direct
Meta	6.2%	8.2%	3.8%
Trip Advisor	8.3%	8.6%	8.0%
Hotel Sites	25.5%	14.6%	38.7%
OTA	42.3%	51.9%	30.7%
Web Search	17.7%	16.8%	18.7%

Exhibit 8

Switching probability between types of sites



Notes: The probability that a user will visit an intermediary and then go to a hotel site is very small—7% in 2014. Most likely, if a user visits an intermediary site he will stay there or continue going there. See: Estis Green, C and MV Lomanno. 2016. "Demystifying the Digital Marketplace: Spotlight on the Hospitality Industry," p. 45, HSMAI Foundation.

visiting both (versus 29 percent). Our 65.5 percent (for OTAs) and 34.5 percent (for hotel direct sites) share visitation figures are not far off from numbers recently reported by Phocuswright,[8] which indicated that 72 percent of U.S. consumers use OTAs for hotel shopping, with 44 percent using hotel websites.

Estimating Impacts for Other Hotel Transactions

Our sample contains 13,867 reservations by 5,970 consumers, including airlines (6,364), rental cars (2,410), and hotels (5,093). Of the total number of consumers, 2,948 visited an OTA but did not make a hotel reservation, with 2,414 of the 2,948 making an airline reservation. If we focus only on OTAs that don't sell airline products (e.g., Hotels.com, Booking.com, Hotwire.com) we have a sample of 1,598 consumers who visited a hotel specific OTA and made an airline reservation but did not book a hotel room online. These consumers either did not need

Exhibit 9

Two-click transitions

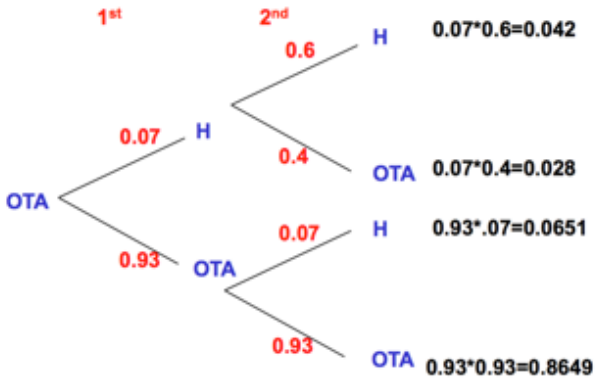


Exhibit 10

Channel switching

Booking Channel	Visited OTA
OTA	2,776
Hotel Direct	1,497
Total	4,273
OTA	65 %
Hotel Direct	35%

Note: *N* = 4,273

a hotel room (stayed with family and friends) or they booked hotel rooms in a manner not tracked by comScore (e.g., phone, travel agent, or mobile).

If we assume some fraction of these airline bookers and hotel specific OTA visitors required a hotel room but made that reservation offline or through a traditional travel agent, we can derive an estimate for the offline component of the billboard effect. For example, if you needed a hotel room only 10 percent of the time you took a flight, then 10 percent of the 1,598, or 159.8, represents a billboard effect of 5.8 percent (159.8 / 2,776 OTA hotel reservations). If you needed hotel accommodations 50 percent of the time, the effect is almost 29 percent. We assume that these 160 consumers (rounded) who visited a hotel specific OTA and made an airline reservation made an offline hotel reservation that was influenced by their visit to the hotel specific OTA. We assert that the visit to an OTA influenced the hotel purchase as a result of our earlier analysis (65 percent of hotel direct reservations

[8] *Phocuswright's Search, Shop, Buy: The New Digital Funnel.*

Exhibit 11

Comparison of billboard estimates

Study	Data/Approach	Estimate of Billboard Effect
Anderson (2009)	Experiment	7.5% to 26%
Estis Green and Lomanno (2016)	Archival comScore panel 2012 and 2014	7% (single move) to 15%* (multiple moves)
Anderson and Han (2017)	Archival comScore panel 2015	5% to 35%

Note: *15 percent is steady state approximation derived in Anderson and Han (2017) using Estis Green and Lomanno (2016) single step transitions.

Exhibit 12

Domain visitation 30 days after reservation

Booking Channel	Reservations	Visiting OTAs (%)	Visiting Hotels (%)	OTA Visits	Hotel Website Visits
OTA	1,016	81	54	9.2	2.2
Direct	620	74	73	8.5	6.4

were preceded by an OTA visit, and these visits are concentrated or close to the time of purchase).

Post-Purchase Behavior

Many hotels engage in some form of revenue management using price to manage supply and demand imbalances. As a result, hotel prices may fluctuate, causing consumers to check prices and time their purchases to get the best price. Also, most hotel reservations have flexible cancellation policies allowing consumers to cancel without penalty if the cancellation is made at least 24 hours prior to check-in. This combination of flexible cancellation policies and fluctuating prices may result in consumers second-guessing their purchase decisions. A potential outcome of this buyers' remorse is that consumers continue to check prices or compare hotels post-purchase.[9] We investigate this aspect of consumer behavior by looking at travel site visitation after the hotel reservation. To isolate pre-purchase research from post-purchase activity we look only at transactions where there is a time gap of at least three months between purchases. A subset of the 5,093 hotel transactions where there was at least 90 days between the hotel transaction and the next travel purchase reduces our sample to 1,636 consumers (1,016 OTA consumers and 620 hotel direct reservations). For these 1,636 consumers we track OTA and hotel website visitation for 30 days after the reservations.

Exhibit 13

Number of unique hotel sites visited post purchase

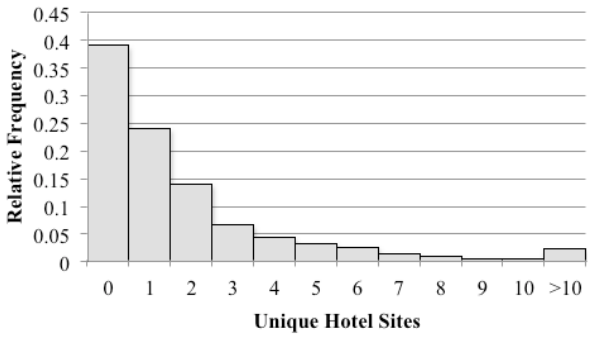


Exhibit 12 shows that, in fact, consumers are more active post-purchase than they are pre-purchase, with the percentage of hotel direct consumers visiting OTAs rising to 74 percent from 65 percent, along with hotel site visitation increasing to 54 percent from 48 percent for OTA bookers. The increased level of OTA visitation by hotel direct bookers is consistent with consumers checking prices to determine whether they paid too much. Exhibit 13 shows the number of different hotel sites that consumers visit post-purchase, indicating that while the average number of times consumers visit hotel sites is over six, they are only visiting one or two sites as they seek additional details about their hotel, or to check prices.

[9] This is a long standing practice. See, for example: Gary M. Thompson and Alexandra Failmezger, "Why Customers Shop Around: A Comparison of Hotel Room Rates and Availability across Booking Channels," *Cornell Hospitality Report*, Vol. 5, No. 2 (2005); Cornell Center for Hospitality Research.

Summary

It has become increasingly difficult for hoteliers to determine which sales and marketing efforts lead to demand, and how these efforts (e.g., sponsored search, banner ads, OTAs, and offers) interact. Without this attribution it is impossible to determine ROI of marketing efforts or true channel specific acquisition costs. So, while it's true that the demand funnel is more complex, to state that the billboard effect is dead as a function of this complexity assumes that a hotel's listing at OTAs only influences those consumers booking at the OTA, and that consumers booking direct with hotels are not influenced by listings at OTAs, even though as indicated in Exhibit 10 over 30 percent of these direct bookers started their research process at an OTA. This study indicates that OTAs now get an increasingly larger share of the transaction landscape, but OTAs are visited by almost two-thirds of all online hotel direct consumers, down about 10 percent from our 2011 study results, showing that the magnitude of the billboard effect is decreasing, even though it has not disappeared entirely.

Booking a hotel online remains a complex activity for all but the most loyal of hotel shoppers, and while almost 39 percent of direct bookers start their travel research at a hotel site (Exhibit 7), 31 percent of consumers who start their search at a hotel site end up booking at an OTA. On average, shoppers conduct a lot of research online in the 60 days before purchasing a hotel reservation, making 25 visits to travel related sites. While research suggests that the ability of a non-direct channel to influence an eventual reservation at a hotel may be low (between 5.5 and 35 percent), there is still a billboard effect on customers as they visit one of these non-direct sites prior to booking. Hoteliers who ensure that their online presence is easy to find, attractive, and competitive will capture more of these customers.

It is important to note that our data sample is observational, and any inferences we draw do not state causation. The only way to truly know the impacts of marketing actions upon hotel transactions is to perform experiments as was done in our 2009 study. We do not indicate that the 35 percent of consumers visiting an OTA who book direct would not have booked at the specified hotel if that hotel had not been listed at the OTA. After all, there are many other methods for creating product awareness. Individual hotels that want to solve the attribution puzzle must conduct a series of these pseudo-experiments in which they stop certain actions for short periods of time (e.g., preferred placement at OTAs, sponsored search at Google, ads within hotel finder at Google) and compare transaction volumes across the treatment periods. ■

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Vol. 16 No. 19 Experimental Evidence that Retaliation Claims Are Unlike Other Employment Discrimination Claims, by David Sherwyn, J.D., and Zev J. Eigen, J.D.

Vol. 16 No. 18 CIHLER Roundtable: Dealing with Shifting Labor Employment Sands, by David Sherwyn, J.D.

Vol. 16 No. 17 Highlights from the 2016 Sustainable and Social Entrepreneurship Enterprises Roundtable, by Jeanne Varney

Vol. 16 No. 16 Hotel Sustainability Benchmarking Index 2016: Energy, Water, and Carbon, by Eric Ricaurte

Vol. 16 No. 15 Hotel Profit Implications from Rising Wages and Inflation in the U.S., by Jack Corgel, Ph.D.

Vol. 16 No. 14 The Business Case for (and Against) Restaurant Tipping, by Michael Lynn, Ph.D.

Vol. 16 No. 13 The Changing Relationship between Supervisors and Subordinates: How Managing This Relationship Evolves over Time, by Michael Sturman, Ph.D. and Sanghee Park, Ph.D.

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