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Using Eye Tracking to Obtain a Deeper Understanding of What Drives Online Hotel Choice

by Breffni Noone, Ph.D., and Stephani Robson, Ph.D.

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EXECUTIVE SUMMARY

Booking a hotel online involves two major stages, namely, browsing and deliberation (followed by booking a hotel). A study that tracked 32 individuals' eye movements as they worked on selecting a hotel to book found that during browsing, consumers quickly glance at many hotels (sometimes scrolling but often just taking the first screen) as they check the names and prices of available hotels. During this process, consumers apply personal heuristics to identify hotels that warrant further scrutiny. During the deliberation phase, consumers review more detailed information for the consideration set—usually no more than about seven properties—from which a purchase decision is made. During the browsing stage, consumers fixate primarily on firm-supplied information, including hotel name, images, price, and location, in addition to user ratings. Within the consideration set, consumers fixate most on images, closely followed by firm-provided descriptions. They also fixate on price and room offers, as well as user-generated ratings and reviews.

Key words: Eye tracking, consumer choice, firm-generated content, user-generated content

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An understanding of how hotel consumers make online purchase decisions is vital to the creation of effective pricing, promotion, and distribution strategies. The two key elements of the online hotel purchase process that warrant attention include the consumers' path to purchase and their use of information during the hotel choice process, which includes both firm-generated content and user-generated content. The path to purchase can be readily captured and described through online analytics, and thus this report does not focus on that matter. Instead we focus on what people actually look at—the screen content. Little is known about how consumers balance firm- and user-generated content while making the hotel purchase decision. In this exploratory study, we focus on how consumers use this information when shopping online for hotels.

Researchers have long hypothesized that the decision to buy a specific good or service is a two-stage process in which consumers first browse a wide set of possible purchases and then select a subset of available offerings to form a consideration set. Consumers make their purchase from that reduced set.[1] In study described here, we seek to extend previous research in the domain of online hotel choice by using eye tracking to examine consumers' use of both firm- and user-generated content during browsing and deliberation in the context of a naturalistic online search. For the purpose of this study we define browsing as occurring when consumers look through information regarding the available hotels, and apply personal heuristics to identify hotels that warrant further scrutiny. Deliberation occurs when a hotel is selected for a more detailed review by means of clicking on a link within search results. These hotels are deemed part of the consumers' consideration set.

In addition to using eye-tracking data to provide insights into the differential use of information during these stages of the choice process, the goal of this study is to generate a series of research questions to motivate additional investigations that will advance the hotel industry's understanding of consumers' online hotel choice behavior.

In this report, we first provide a brief overview of research relating to the online hotel purchase process. We then outline the quantitative findings of our exploratory study, discuss the implications for hotel managers, and outline an agenda for future research.

Online Hotel Purchase Behavior

Research on online hotel purchase behavior broadly fits into one of two categories: analysis of the consumer's path to purchase through the tracking of clickstreams, and investigations of the information driving hotel choice via a number of different methodologies.

Clickstream analysis traces the path that users take as they click from webpage to webpage, how long they spend on each page, the point at which they exit a given website, and, of course, where they go next.[2] While there is a substantial amount of clickstream research examining how consumers use the internet to research travel in general,[3] the number of clickstream studies specifically related to online hotel search is small. Most notably, Anderson used clickstream data to provide support for a phenomenon known as the billboard effect, which describes the incremental reservations that a "Brand.com" distribution channel receives as a result of being listed on the site of an online travel agent (OTA).[4] In another study recognizing the value of clickstream analysis, Ward and Shafagi propose the inclusion of clickstream analytics within a framework for assessing the internal and external influences on hotel selection.[5]

While clickstream analysis enables the identification of consumers' online path prior to purchase, it does not enable hotel operators to identify what particular information on a given page caused consumers to narrow down their hotel choice set or to make their selection. While a number of surveys and OTA usage studies have examined the hotel attributes that consumers seek during the choice process (e.g., free wi-fi, fitness center, non-smoking rooms),[6] the focus in our research is on the types of information that consumers actually look at during the choice process. Two recent studies by Noone and McGuire sought to investigate customer use of firm- and user-generated content in the online hotel purchase process. In their first, scenario-based study they examined the relative roles of price, consumer reviews, and aggregate consumer ratings on two key drivers of hotel choice: quality and value.[7] Their findings suggest that in the presence of user-generated content, price does not have a significant impact on consumers' perceptions of quality. They also indicate that price and user-generated content have significant effects on perceived value, although consumers rely more on reviews than ratings when evaluating price-benefit tradeoffs. In the second study, Noone and McGuire used discrete choice analysis to examine how hotel consumers trade off price with the following attributes: brand name, TripAdvisor ranking, consumers' aggregate rat-

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1 Gensch, Dennis H. "A two-stage disaggregate attribute choice model." Marketing Science 6, no. 3 (1987): 223-239.

2 Bucklin, Randolph E., and Catarina Sismeiro. "Click here for Internet insight: Advances in clickstream data analysis in marketing." Journal of Interactive Marketing 23, no. 1 (2009): 35-48.

3 Park, Jungkun, and Hoeun Chung. "Consumers' travel website transferring behaviour: analysis using clickstream data-time, frequency, and spending." The Service Industries Journal 29, no. 10 (2009): 1451-1463; Expedia MediaSolutions. "The Traveler's Path to Purchase". 2013; and Ipsos MediaCT/Google Travel Study, May/June 0213.

4 Anderson, Chris K. "The Billboard effect: Online travel agent impact on non-OTA reservation volume." Cornell Hospitality Reports 9, no. 16 (2009); and Anderson, Chris. "Search, OTAs, and online booking: An expanded analysis of the billboard effect." Cornell Hospitality Report 11, no. 8 (2011).

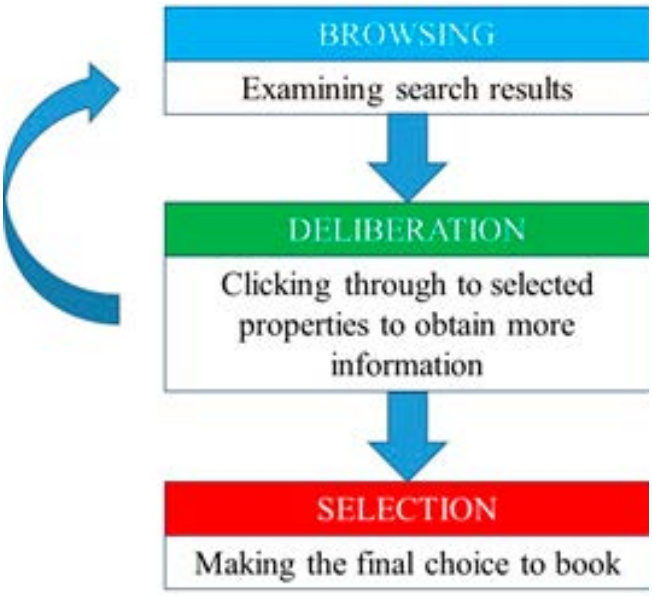
5 Ward, Manus, and Mathew Shafaghi. "A Literature Framework Analysis of Online Hotel Accommodation Process Factors." In Information and Communication Technologies in Tourism 2014, pp. 481-494. Springer International Publishing, 2013.

6 Jones, Peter, and Meng-Mei Chen. "Factors determining hotel selection: Online behaviour by leisure travellers." Tourism and Hospitality Research 11, no. 1 (2011): 83-95; Yavas, Ugur, and Emin Babakus. "Dimensions of hotel choice criteria: congruence between business and leisure travelers." International Journal of Hospitality Management 24, no. 3 (2005): 359-367; and Kim, Dohee, and Richard R. Perdue. "The effects of cognitive, affective, and sensory attributes on hotel choice." International Journal of Hospitality Management 35 (2013): 246-257.

7 Noone, Breffni M., and Kelly A. McGuire. "Effects of price and user-generated content on consumers' prepurchase evaluations of variably priced services." Journal of Hospitality & Tourism Research (2013): 1096348012461551.

Exhibit 1

Conceptual diagram of the hotel choice process



ings, and consumers' reviews (including valence, content, and language).[8] While all types of information had a significant effect on hotel choice in this study, review valence (whether positive or negative) emerged as the dominant choice driver. While that second study provides insights into the roles of firm- and user-generated content in hotel choice, it was conducted in the context of a consideration set and did not address the potential differences in how consumers actively engage with user-generated content, price, and other forms of firm-generated content, during browsing and deliberation.

Using sophisticated search tools and third-party websites, consumers have almost instant access to comprehensive lists of possible hotel options and links to detailed information about each available hotel property. Consumers typically browse a list of available hotels and, by means of clicking on a link within search results, select certain hotels for a more detailed review. As illustrated in Exhibit 1, this process is typically iterative in nature. Consumers browse, then select a hotel for detailed review, return to browsing again, select a hotel for review and so on. Hotel sites that receive a detailed review are deemed part of the consumers' consideration set from which a purchase decision is eventually made. In this study, we focus on the specific information that consumers use during browsing and deliberation. We are particularly interested in the relative weight given to user-generated information and that from the firm itself. By recording which material people fixate on, eye tracking studies give us substantial evidence on these issues.

Using Eye Tracking to Understand the Drivers of Hotel Choice

Eye tracking provides direct capture of eye movements in response to a stimulus.[9] Eye movement is a combination of fixations and saccades. A fixation is when the eye gaze pauses in a certain spot, while a saccade occurs when the eye moves to another position. In eye tracking, the fixation is the most important point of data; researchers want to understand where someone is focusing attention and often for how long. Eye tracking technology collects eye position and pupil dilation data to determine fixations, enabling researchers to identify the location and duration of fixations with a high degree of precision. The resulting dataset provides a comprehensive resource for quantitatively measuring attention to any sort of text, image, or environment. Retrospective think-aloud (RTA) interviews can then be used as a follow up to eye tracking to provide qualitative insight into user thought processes and perceptions while observing a given stimulus. For a detailed discussion of eye tracking methodology and its application to hospitality research questions, please see our related CHR Report, "Show Me What You See, Tell Me What You Think: Using Eye Tracking for Hospitality Research."[10]

Although eye tracking has proven to be a valuable and popular research method across multiple industries for evaluating the effectiveness of advertising and website design,[11] we have seen it applied in just a few hotel-related studies. Pan, Zhang, and Smith used eye tracking as part of a mixed-methods approach to study consumers' OTA-based information search strategy and OTA website usability in the context of hotel and flight selection.[12] More recently, Pan, Zhang, and Law used eye tracking to examine the attention paid by consumers to the hotels listed on a simulated search page and found that displaying a relatively small number of results accompanied by images is more effective in capturing prospective guests' attention than showing large numbers of results or offering text-only search results.[13] In this study we seek to extend and enrich this stream of research by using eye tracking in an actual

[8] Noone, Breffni M., and Kelly A. McGuire. "Pricing in a social world: The influence of non-price information on hotel choice." Journal of Revenue & Pricing Management 12, no. 5 (2013): 385-401.

[9] Rayner, K. (1998). Eye movements and information processing: 20 years of research. Psychological Bulletin, 124 (3), 372-422.

[10] Cornell Hospitality Report, Vol. 14, No 17.

[11] Duchowski, Andrew. Eye tracking methodology: Theory and practice. Vol. 373. Springer, 2007.

[12] Pan, Bing, Lixuan Zhang, and Kevin Smith. "A Mixed-Method Study of User Behavior and Usability on an Online Travel Agency." Information Technology & Tourism 13, no. 4 (2011): 353-364.

[13] Pan, Bing, Lixuan Zhang, and Rob Law. "The Complex Matter of Online Hotel Choice." Cornell Hospitality Quarterly 54, no. 1 (2013): 74-83.

online search for a hotel for a hypothetical trip, allowing us to examine consumers' information usage as they browse and deliberate on which hotel to choose.

Study Methodology

We employed the services of a university-based research center to recruit study participants who had made a hotel reservation online within the prior six months. For technical reasons, we had to exclude individuals who wore glasses and those with certain vision issues.[14] A total of thirty-two participants were recruited, and we paid them $15 in cash for a sixty-minute session.

Technical issues involving the eye tracking equipment include the selection of an eye-tracking system that is integrated into a computer monitor (the Tobii T-60 eye tracker). The monitor also houses a video camera and audio recorder which enabled us to capture participants' facial expressions and record their comments during the task. The eye tracking software also recorded the URLs for the websites the participants visited and the amount of time that they spent on each site.

We started the test by having participants complete a 19-item survey of their demographic information and hotel choice criteria. Participants were then given a choice of three possible U.S. travel destinations and were instructed to imagine they were taking a three-day weekend leisure trip to that location. Based on this common travel frame, participants were instructed to perform an online search for a hotel for this hypothetical trip using whatever methods and websites they would typically use, and to stop when they had made a hotel selection but before they actually booked the hotel. In the second half of the session, we conducted in-depth retrospective think-aloud interviews with participants, which will be reported elsewhere. This report focuses on the quantitative findings regarding what participants fixated upon during the search process, and how the nature and frequency of those fixations differed by stage of the choice process.

Data Analysis

As we explained, the primary data for this study were participants' eye fixations during their online session. We generated dynamic gaze plot visualizations for each search session, and from these we manually coded each of the hundreds of eye fixations per session to identify the names of the hotels and the specific pieces of information about those hotels that the participants observed. We independently coded each of these gaze plots and checked for inter-rater reliability to ensure that the data were homogenously coded. These data were subsequently categorized by information type and stage of the choice process (browsing or deliberation) for each hotel reviewed by participants. We categorized the hotels that participants viewed in the following way:

Browse-only hotels. Browse-only hotels were those that participants looked at while scrolling through search results but did not choose to click through to view in more detail.

Consideration set. The consideration set comprised all hotels in the search results that the participants clicked through to review detailed information, or that participants specifically searched for by name during their session.

Chosen hotel. The chosen hotel was the property that the participant eventually identified as the property he or she selected to book.

We identified fourteen information categories in total during this process, some representing data created by the hotel or its agents and the remainder representing user-generated content. They were coded as follows:

Firm-generated Content

NAME: the name of the property which included the brand name for branded hotels;

IMAGE: exterior or interior photographs of the hotel provided by the hotel or brand;

PRICE: price information for the hotel property;

LOCATION: a general statement about where the hotel is located within its market, such as "downtown," or an indication of how far the hotel is from a particular location or attraction;

DESCRIPTION: text that describes the hotel and its offerings;

OFFER: information that suggests a special offer or value proposition (e.g., "Free cancellation" or "Save 10% on this stay");

MAP: a static or interactive map showing the hotel and nearby features, roads, and attractions, as well as other lodging properties; and

STAR: hotel class (one through five stars).

User-generated Content

RATING: consumers' quantitative ratings (typically on a 5-point scale);

REVIEWS: the number of reviews the property has received;

REVIEW TEXT: the content of a consumer's written review;

REVIEWER PROFILE: profile information about individual reviewers, including demographics and review frequency and quality ratings;

[14] Phukan, Anjali and Margaret Re. "Consideration for Using Eye Trackers during Usability Studies." in Internationalization, Design and Global Development. ed. N. Aykin (Springer Berlin Heidelberg, 2009): 301-307.

Exhibit 2

Summary participant profiles

Participant	Gender	Age	# hotel reservations	# hotel stays	Travel	Average rate per night	Typically frequents brands	Hotel loyalty program membership
ID1	Male	49-68	1-2	1-2	Alone	$100-$149	Yes	Yes
ID2	Female	33-48	1-2	3-5	Family	$150-$199	No	No
ID3	Female	18-32	1-2	3-5	Friends	$150-$199	No	No
ID4	Female	18-32	1-2	1-2	Family	$50-$99	Yes	No
ID5	Female	33-48	3-5	3-5	Family	$100-$149	Yes	Yes
ID6	Male	18-32	1-2	1-2	Friends	$100-$149	No	No
ID7	Female	18-32	1-2	1-2	Friends	$50-$99	No	No
ID8	Female	18-32	1-2	1-2	Friends	Less than $50	No	No
ID9	Female	33-48	1-2	1-2	Family	$100-$149	No	No
ID10	Female	18-32	3-5	3-5	Family	$100-$149	Yes	No
ID11	Female	33-48	3-5	3-5	Family	$150-$199	Yes	Yes
ID12	Female	49-68	1-2	6-10	Friends	$150-$199	No	Yes
ID13	Male	49-68	3-5	1-2	Friends	$100-$149	No	No
ID14	Female	49-68	1-2	3-5	Family	$150-$199	Yes	Yes
ID15	Male	49-68	1-2	3-5	Family	$100-$149	Yes	Yes
ID16	Male	49-68	3-5	3-5	Family	$100-$149	Yes	Yes
ID17	Female	33-48	1-2	1-2	Family	$100-$149	Yes	Yes
ID18	Female	33-48	3-5	3-5	Family	$150-$199	Yes	Yes
ID19	Male	18-32	1-2	3-5	Family	$100-$149	Yes	Yes
ID20	Female	33-48	1-2	1-2	Family	$100-$149	No	No
ID21	Female	33-48	1-2	1-2	Family	$100-$149	No	Yes
ID22	Female	33-48	3-5	3-5	Family	$100-$149	Yes	Yes
ID23	Male	18-32	1-2	1-2	Family	$50-$99	No	No
ID24	Male	33-48	1-2	1-2	Alone	$150-$199	No	Yes
ID25	Female	18-32	1-2	3-5	Family	$100-$149	Yes	No
ID26	Female	33-48	1-2	1-2	Family	$100-$149	Yes	Yes
ID27	Female	33-48	3-5	3-5	Family	$100-$149	Yes	No
ID28	Male	49-68	1-2	1-2	Family	$50-$99	No	Yes
ID29	Male	18-32	1-2	1-2	Family	$100-$149	Yes	No
ID30	Male	33-48	1-2	3-5	Family	$150-$199	No	Yes
ID31	Male	18-32	3-5	1-2	Family	$300 or more	Yes	Yes
ID32	Male	18-32	1-2	1-2	Family	$50-$99	No	No

USER IMAGE: photographs of the hotel provided by users and posted on social media; and

RANK: the TripAdvisor ranking (e.g., "2nd out of 46" hotels in a given market).

Participant Profile

Exhibit 2 summarizes the characteristics of the thirty-two participants in this exploratory study. Nineteen of the users were women, and three generations were represented among the participants: Millennials (18-32; n = 11), Generation X

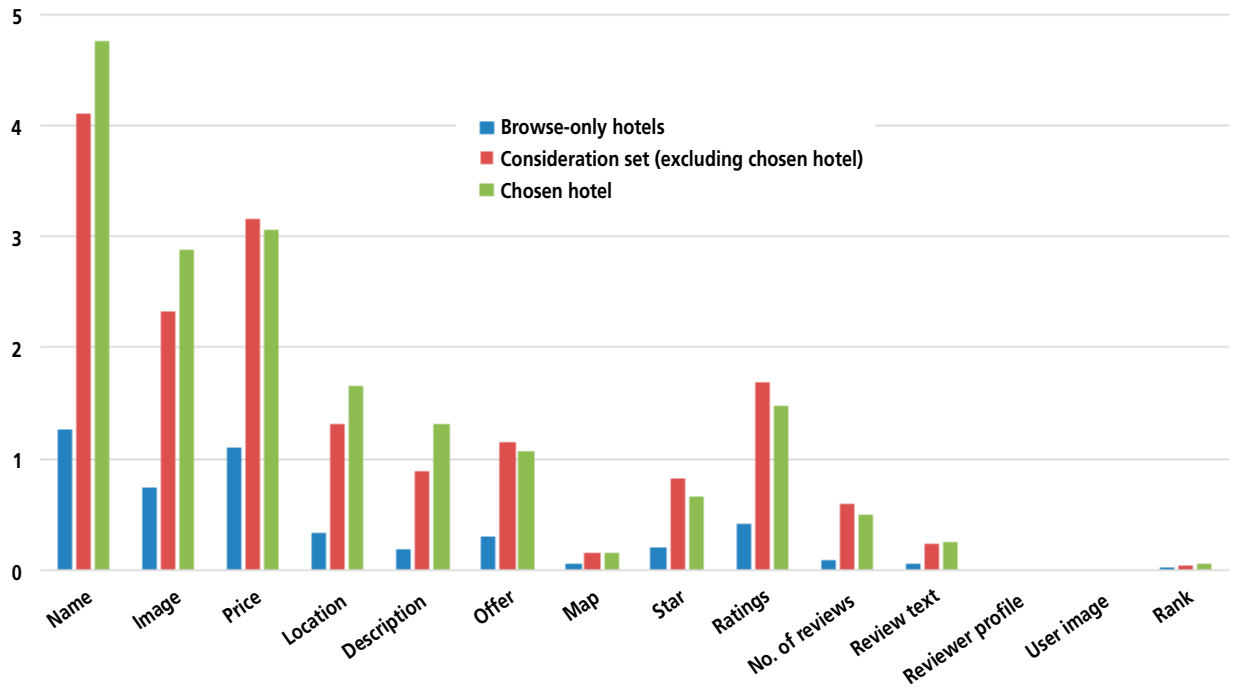
Exhibit 3

"Look" and "book" activity

Website	Look (# Participants)	Book (# participants)
Hotels.com	10	7
Expedia.com	9	5
TripAdvisor.com	6	-
Orbitz.com	3	2
Booking.com	2	1
Priceline.com	2	2
Kayak.com	2	1
Travelocity.com	2	1
Hotwire.com	1	-
Yelp.com	1	-
Olotels.com	1	1
DowntownAustinHotels.net	1	1
hotelaustindowntown.com	1	-
Hotel website	11	11

Exhibit 4

Average fixations by information type during browsing phase



(33-48; n = 13), and Baby Boomers (49-68; n = 7). Within the six months prior to the study, about three-quarters of the participants had made one or two online hotel reservations (n = 23,), and just over half had stayed in a hotel once or twice (n = 17). Three-quarters reported that they tend to take leisure trips with family (n =24). Half said they spend $100 to $149 on a room (n = 17) and one-fourth said their price range was usually $150-$199 (n = 8). Just over half of the participants were members of hotel loyalty programs (n = 17), with an equal number reporting that they typically stay with specific hotel brands when traveling for leisure.

Findings

"Look" and "book" activity

Before presenting our findings regarding participants' visual behavior during the hotel choice process, it's worth noting the route that participants took during their online search. Despite the fact that over half of the participants were members of hotel loyalty programs, only three began their search on a specific hotel brand's website. The remaining 29 participants began with a search via an OTA or other third-party website (e.g., TripAdvisor, Yelp). Hotels.com and Expedia each received a similar number of visits (10 for Hotels.com and 9 for Expedia). In total, 11 participants visited specific hotel "Brand.com" websites at some point during the search process. Ultimately, 11 participants used a hotel website to make their booking, although not all of these participants were loyalty program members, but the other 21 booked on a third-party website (see Exhibit 3).

Exhibit 5

Average number of fixations by information type during browsing phase

	Average # of fixations per hotel (browse-only hotels)	Rank	Average # of fixations per hotel (rest of consideration set)	Rank	Average # of fixations for chosen hotel	Rank
Name	1.26	1	4.10	1	4.75	1
Image	0.73	3	2.32	3	2.88	3
Price	1.10	2	1.69	4	3.06	2
Location	0.33	5	0.59	9	1.66	4
Description	0.18	8	0.88	7	1.31	6
Offer	0.29	6	1.15	6	1.06	7
Map	0.06	11	0.00	14	0.16	11
Star	0.20	7	0.82	8	0.66	8
Ratings	0.42	4	3.16	2	1.47	5
# Reviews	0.09	9	1.31	5	0.50	9
Summary review text	0.06	10	0.24	10	0.25	10
Reviewer profile	0.00	14	0.00	13	0.00	14
User image	0.00	13	0.04	12	0.00	13
Rank	0.02	12	0.15	11	0.06	12

Fixations during the Browsing Phase

Participants viewed information relating to a mean of 41 hotels during the browsing phase. The range of hotels viewed was wide, however, as some participants viewed as few as seven hotels, while others browsed well over 100 properties. The types of information that participants viewed during the browsing phase are illustrated in Exhibit 4 and summarized in Exhibit 5.

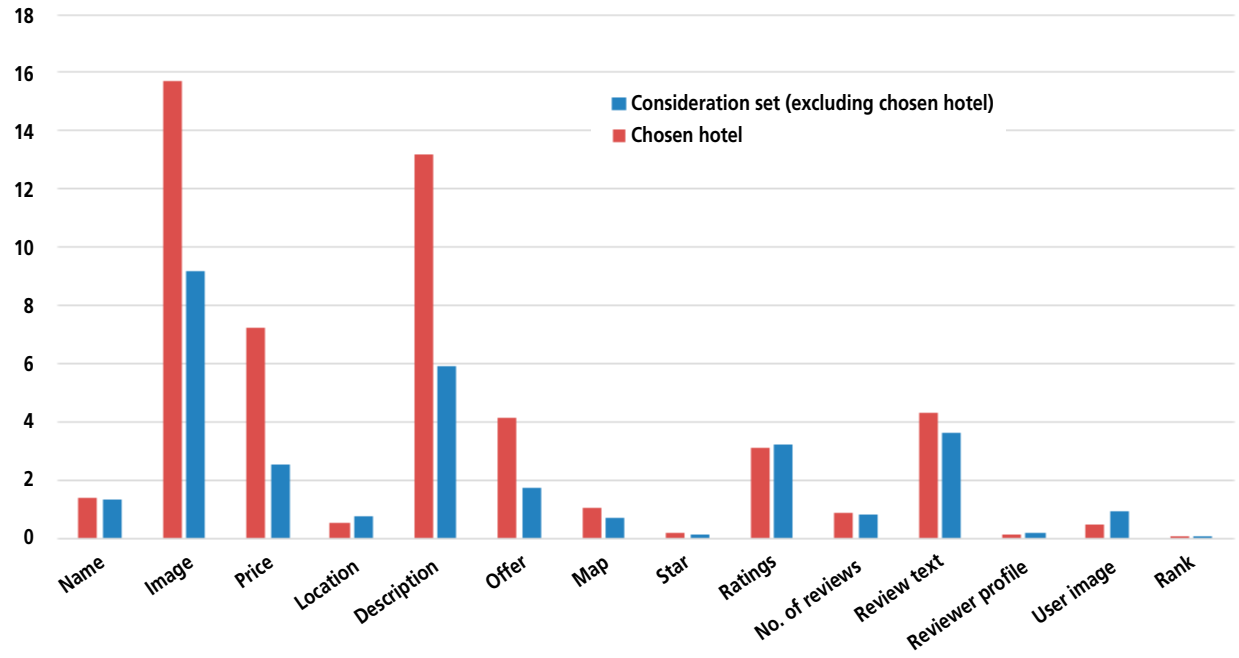
For hotels that participants viewed during browsing but did not consider further, participants fixated approximately once on the hotel's name (M=1.26) and price (M=1.10), on average, and barely glanced at other information (less than once, on average). For hotels that were included in the consideration set but not chosen, participants fixated on the hotel name (M=4.10), consumer ratings (M=3.16), hotel image (M=2.32), and, to a lesser extent, price (M=1.69) and number of reviews (M=1.31). Fixations for the chosen hotel during browsing followed a somewhat similar pattern to that of other hotels in the consideration set, with multiple fixations on hotel name (M=4.75) and hotel image (M=2.88). Price for the chosen hotel also received multiple fixations (M=3.06) during browsing, with more than one fixation, on average, on location (M=1.66), ratings (M=1.47), and hotel descriptions (M=1.31).

Fixations during the Deliberation Phase

Visual behavior changed substantially during the deliberation phase of the hotel choice process. Participants selected between one and seven hotels for inclusion in their consideration set (M = 3.10), and the information that they fixated on during this phase is illustrated in Exhibit 6 and summarized in Exhibit 7. Most notably, participants fixated most on images (chosen hotel: M=15.74, other hotels: M=9.18), with paragraphs of descriptive text receiving the next highest number of fixations (chosen hotel: M=13.22, other hotels: M=5.95). Firm-generated images were sought out much more frequently than images provided by users. For the chosen hotel, ratings (M=7.25) and reviews (M=4.31) were viewed more often than they were for the other hotels in the consideration set (ratings: M=2.5, reviews: M=3.62). During this phase, participants fixated slightly less on price, including the individual prices for different room types and packages, for the chosen hotel (M=3.13) than for the other hotels in the consideration set (M=3.25), but fixated more on offers (chosen hotel: M=4.16, other hotels: M=1.74). Other user-generated content, including TripAdvisor rank and reviewer profiles, garnered a substantially lower number of fixations on average.

Exhibit 6

Average fixations by information type during deliberation phase



Self-reported Importance of Information versus Fixations

The questionnaire that preceded the online search exercise asked participants to rate their perceptions of the importance in hotel selection of such information as brand name, the physical appearance of a hotel property, and consumers' ratings and reviews. This allowed us to compare the stated importance of these information points and the number of fixations related to them during browsing and deliberation, as presented in Exhibit 8. During browsing, the average number of fixations that participants made on each hotel name they viewed increased as the stated importance of brand name increased, only dropping slightly at a stated importance rating of 5. Likewise, the average number of images that participants viewed for each hotel during browsing increased as the stated importance the physical appearance of a hotel property increased. During deliberation, however, an interesting pattern emerged for fixations on images. Regardless of how participants rated the importance of the physical appearance of a hotel property, the average number of fixations on images for each hotel viewed remained high relative to all other content.

Both during browsing and deliberation, the number of fixations on consumer ratings generally increased with participants' stated importance of consumer ratings, peaking during deliberation (M=4.54) for those participants who

Exhibit 7

Average fixations by information type during deliberation phase

	Average number of fixations for chosen hotel	Rank	Average number of fixations per hotel (rest of consideration set)	Rank
Name	1.44	7	1.36	7
Image	15.72	1	9.18	1
Price	3.13	6	3.25	4
Location	0.91	9	0.86	9
Description	13.22	2	5.95	2
Offer	4.16	5	1.74	6
Map	0.16	13	0.22	12
Star	0.19	12	0.16	13
Ratings	7.25	3	2.55	5
# Reviews	0.56	10	0.78	10
Review text	4.31	4	3.62	3
Reviewer profile	0.50	11	0.97	8
User image	0.13	14	0.10	14
Rank	1.06	8	s0.75	11

Exhibit 8

Respondents' reports of importance of information versus number of fixations

	Brand Name (mean importance: 2.63)	Physical Appearance (mean importance: 3.53)		Consumer Ratings (mean importance: 3.81)		Consumer reviews (mean importance: 3.78)
Stated Importance	Average fixations on hotel name during browsing	Average fixations on hotel image during browsing	Average fixations on hotel image during deliberation	Average fixations on consumer ratings during browsing	Average fixations on consumer ratings during deliberation	Average fixations on review text during deliberation
5	1.76	1.00	11.12	1.08	4.54	4.15
4	2.14	0.90	14.78	0.30	2.93	3.57
3	1.78	0.95	8.86	0.46	2.05	4.40
2	1.41	0.84	8.42	0.67	3.07	1.14
1	1.30	0.28	10.00	0.00	0.00	0.00

Notes: Importance is rated on a five-point scale anchored by Very important and Not at all important. Fixation tallies are the average number of fixations per hotel. Full review text is generally not displayed on initial search results, but is available during deliberation.

indicated that consumer ratings were very important to their decision. For consumer reviews, the average number of fixations peaked when participants' stated importance of reviews was 3 out of 5 (M=4.40), dropping slightly when the stated importance of reviews was 4 (M=3.57) or 5 (M=s4.15).

Discussion and Managerial Implications

One thing we noted from this eye-tracking exercise is that the hotel eventually chosen by participants was often one that was viewed relatively early in the search process. For roughly half of all participants (47.8%) the hotel that would be their eventual choice appeared in the first quintile of the total number of fixations. This finding supports prior eye-tracking studies that found that users rarely look beyond the first page of results, often limiting fixations to the first few search results that appear. This also is consistent with the types of statistics reported by third-party distribution channels. For instance, Expedia reports that 95 percent of all transactions on their site take place with hotels listed on the first page of search results. [15]

The methods for optimizing a search have been discussed in many other studies.[16] Assuming a hotel can gain optimal search results positioning, its operators must then understand the types of information that consumers use to include that hotel in a consideration set, and to ensure that this information is presented in a manner that maximizes the likelihood of inclusion in the consideration set. A hotel manager may not have control over certain pieces of information such as the hotel's name, but can certainly influence the way that information which is within management's control (e.g., images) are presented. Once a hotel is within a consideration set, the question then becomes what information ultimately drives the consumer to choose a given hotel property.

The findings of this study suggest that consumers' visual behavior during the browsing phase is different for hotels that are merely browsed and those that are included in the consideration set. For browse-only hotels, participants fixated primarily on only two types of information, hotel name and price, both of which were firm-generated. For hotels in the consideration set, participants looked at more types of information and did so with greater frequency. In addition to looking at name and price, participants fixated multiple times on firm-generated images, location information, and descriptions, as well as on user ratings. One reason for this is that other user-generated content, for example, full review text, reviewer profiles, and user images, are typically available only when the consumer has clicked through to the hotel's site during deliberation.

The combination of hotel name and price, images, descriptions, and user ratings may provide a powerful signal of the experience quality and value that will be delivered. Given that close to 60 percent of U.S. hotels are affiliated with a brand,[17] a hotel's name can convey a great deal about

[15] Lorigo, Lori, Maya Haridasan, Hrönn Brynjarsdóttir, Ling Xia, Thorsten Joachims, Geri Gay, Laura Granka, Fabio Pellacini, and Bing Pan. "Eye tracking and online search: Lessons learned and challenges ahead." *Journal of the American Society for Information Science and Technology* 59, no. 7 (2008): 1041-1052.

[16] For example, see: Greg Bodenlos, Victor Bogert, Dan Gordon, Carter Hearne, and Chris Anderson, "Best Practices in Search Engine Marketing and Optimization: The Case of the St. James Hotel," *Cornell Hospitality Reports*, Vol. 10, No. 16 (2010); Cornell Center for Hospitality Research.

[17] STR Global

its quality level and the type of experience a consumer might expect during a stay. Likewise, images can quickly provide the consumer with an enormous amount of information, such as property condition, approximate age, configuration, and general size. Name and image, as they relate to the price quoted, serve as a value check and as a useful filter for selecting properties for further consideration. Average ratings, while more subjective, are also likely to be interpreted as shorthand for overall hotel quality.

In sum, our findings in relation to the browsing phase suggest that firm-generated content may be used primarily to winnow the field to a consideration set, but when a particular hotel piques a consumer's interest, a mix of firm- and user-generated content is used to determine whether that hotel is selected for deeper consideration.

During the deliberation phase, two types of firm-generated content—image and description—dominated participants' fixations. Not surprisingly, hotel name was less frequently viewed during the deliberation phase. Price received multiple fixations during deliberation, due in part to many participants looking at prices by room type. Almost every participant we studied had multiple fixations on descriptive text for each hotel they considered, suggesting the importance of engaging and well-written copy.

In terms of consumers' use of user-generated content, participants fixated on ratings multiple times during deliberation, in particular for the hotel that they ultimately chose. Reviews also received multiple fixations across all hotels within the consideration set, although some participants did not read any reviews at all during their searches. The number of fixations on reviews for those participants who did read them was consistent with previous research which found that consumers tend to read no more than six reviews to assess a given organization.[18] Interestingly, TripAdvisor rank received minimal interest from participants, despite the presence of this information on many of the major OTA sites. Reviewer profiles and user images, when available, also received few fixations. The fact that detailed reviewer profile information and user images are not available across all hotel or related third party websites may have contributed to the lack of participant focus on these two types of user content. That said, user images are readily available on Trip Advisor, and also on social media sites like Facebook and Instagram, yet none of the participants leveraged the latter two sites as information sources during their online search.

We also examined the relationship between what participants said was important to them and what they actually looked at during their searches. Broadly speaking, visual behavior was in sync with participants' stated importance of the various information sources available to them, with the exception of firm-generated images. Regardless of how participants rated the importance of physical appearance, the average number of fixations on hotel images during the deliberation phase was high. Images were also important during the browsing phase, with a higher average number of fixations per hotel on images of properties within the consideration set than on images for browse-only hotels. These findings suggest that hotel images play a particularly important role throughout the hotel selection process and are worthy of much more study.

Roadmap for Future Research

While this exploratory study yields insights into the what and when of consumers' use of firm-generated and user-generated content during online hotel choice, it raises a number of questions, providing numerous avenues for future research.

The role of images in the choice process. The number of times that participants fixated on images suggests that pictures may play a significant role in the online hotel choice process. So far, little has been published about precisely what effect hotel images have on consumers, or on what kinds of images are most influential to the hotel purchase decision. We can think of numerous issues to examine here, including which image attributes (e.g., interior vs. exterior, public space vs. guestrooms, daytime or nighttime shots) are most effective and under which circumstances; how consumers trade off images with other types of information during the hotel choice process; whether a good image can compensate for less favorable ratings during browsing or for a bad review during deliberation; whether a well-known brand name can be strong enough to overshadow a poor photo; whether a photo trumps a brand logo in search results; or whether changing a hotel's online photo affects pricing.

The importance of location. In this study, it appeared that many participants were drawn to short statements about the hotel's location, such as "1 mile from downtown" during the browsing phase, while others made significant use of maps during their searches to relate the hotels they were considering to major transportation routes and to points of interest. One valuable future study would investigate whether placing more emphasis on positive aspects of a hotel's location influences the click-through rate or the propensity to purchase.

Effectiveness of descriptive text. We saw that descriptive text was often viewed during deliberation, and that descriptions of offerings such as free breakfast or free parking

[18] Anderson, Myles, Local consumer review survey 2013, http://www.brightlocal.com/2013/06/25/local-consumer-review-survey-2013/; and Park, Do-Hyung, Jumin Lee and Ingoo Han "The effect of onsline consumer reviews on consumer purchasing intention: The moderating role of involvement." *International Journal of Electronic Commerce*, 11(4), (2007): 125-148.

were of particular interest. It would be useful for marketers to know precisely which text is being examined, and how influential that information is to the purchase decision, as well as how content should be formatted to capture consumers' attention, and what should be highlighted.

The role of ratings in the choice process. The research by Noone and McGuire suggests that consumer reviews dominate numerical ratings in terms of the attributes that drive hotel choice within a consideration set. However, the multiple fixations on ratings by this study's participants during browsing suggests that the role of consumer ratings should not be underestimated. Future research should examine how consumers weight ratings against observed firm-provided content (e.g., hotel name, price, images, descriptions) during browsing to assess the role of ratings in driving selection of the consideration set.

Use of social media during the choice process. All of the participants in this study used "traditional" electronic methods to search for hotels (i.e., hotel websites, third-party distribution channels, and review sites), but they did not visit social media sites like Facebook and Instagram to view user content or promotional offers posted by firms on these sites. It would be beneficial to conduct research to assess the potential for these types of website to influence the choice process. This could provide guidance for hotel operators regarding where to assign resources to drive revenue.

Variations in information observed by travel context. Since this study was conducted in the context of leisure travel, further work is needed to examine potential differences in consumers' use of firm- and user-generated content to inform online hotel choice in business or group travel. Also, the scenario presented in this study required participants to find lodging in popular urban destinations in the United States. It is possible that international travel or travel to resort destinations would result in quite different hotel search behavior.

The impact of multiple hotel search sessions and input of others on hotel choice. While this study used naturalistic online search to explore how consumers use firm- and user-generated content during the hotel purchase decision, our observations were limited to a single, lab-based session for each participant. In practice, the hotel choice process tends to extend over multiple search sessions, with consumers frequently performing multiple searches over time before making a final selection. Consumers also often seek additional information from offline sources or input from traveling companions before they commit to a booking. Future research in this area will need to consider methodological approaches that will allow assessment of how these factors contribute to the hotel choice process.

With so much still to be learned about the role and influence of firm- and user-generated content on hotel choice, we anticipate many more studies that use eye tracking and other technologies to capture actual consumers' hotel choice behavior and to rigorously test hypotheses that will provide the hospitality industry with practical insights for turning looking into booking. ■

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