Travel Distance and Service Satisfaction: An Inverted U-shaped Relationship

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Abstract

The existing literature suggests that travel distance is a crucial factor that determines tourism demand and tourist behavior. However, there are limited attempts to understand how tourists' travel distance shapes their experiences, and more specifically, their satisfaction in a destination. This paper aims to shed light on the distance–satisfaction relationship by analyzing a large data set of more than 36,000 online hotel reviews at four large US cities in a one-year time period. The results show an inverted U-shaped relationship between travel distance and service satisfaction. Inflection points of the quadratic relationship across different cities are also identified. The implications of these findings contribute to literature on tourism geography and allow tourism marketers to develop more effective differential marketing strategies.

Key words: Travel distance, service satisfaction, distance decay, big data

Introduction

From a geographical perspective, tourism is typically the movement of tourists to a non-routine environment for certain types of experiences, and the travel distance between origin and destination represents the effort that a tourist makes to overcome the geographical obstacles for travel. Therefore, travel distance has long been regarded as a vital parameter in understanding tourism demand and tourist behavior (Nyaupane, Graefe, & Burns, 2003; Nicolau, 2008; Larsen & Guiver, 2013). For example, the conventional gravity model from economic geography underscores a distance decay of tourism demand, suggesting that tourist volume to a destination is negatively associated with its distance to the origin. Therefore, distance-based matrices, such as a market access index and intervening opportunity index, have been heavily used to understand the geographic pattern of tourism demand (Yang & Fik, 2014). Moreover, travel distance tends to influence tourist behavior in the destination, such as their duration of stay (Nicolau, Zach, & Tussyadiah, 2016) and overall expenditure (Marcussen, 2011). In general, it is economic rationale for a traveler to stay longer and spend more in a distant destination to make the economic and time cost associated with the long haul travel worthwhile.

Despite the abundant literature on understanding the effect of travel distance on tourism demand at both aggregate and individual levels, little is known about how tourists' travel distance shapes their experiences, and more specifically, their satisfaction with accommodations that are key part of travel experiences (Stevens, 1992). Some scholars in retailing and marketing have discussed the role of travel distance in evaluating shopping experiences. It has been identified that the consumers, in general, try to reduce the travel distance to the stores because the distance generates a negative impact on utility in forming the overall evaluation to the shopping behaviors (Darley & Lim, 1999; Hsu, Huang, & Swanson, 2010). However, along with

the features of hospitality (i.e., intangibility and perishability) as well as tourism (i.e., novelty seeking motivation) (Jang & Feng, 2007; Wong, Dean, & White, 1999), the distance–satisfaction relationship does not necessarily show identical patterns with the context of retailing. Hospitality literature on understanding the distance–satisfaction relationship is largely paucity.

To fill the research gap mentioned above, in this study, we aim to investigate the relationship between tourists' travel distance and their hotel service satisfaction based on a large data set of 36,818 online reviews at four large US cities in a one-year time period. Based on the literature and relevant theories, we propose a non-linear relationship between distance and satisfaction, and this relationship is empirically tested by using a quadratic term of travel distance in multi-level ordered logit models. By doing so, we aim to make several contributions to the current literature. First, we present the theoretical underpinning for the quadratic distance–satisfaction relationship. Unlike previous literature positing a monotonic relationship (e.g., Nyaupane et al., 2003; Walsh, Sanders, & McKean, 1990), our results tend to better improve the understanding of traveler experience between short, middle, and long haul tourists. In particular, the inflection point of this quadratic relationship provides interesting implications on destination marketing and operation efforts. Second, we demonstrate the usefulness of leveraging online hotel review data as a geospatial data source to monitor the geography of the market. More specifically, compared to previous survey data, this type of geo-tagged user generated content (UGC) data is more representative on geographic scope of market because of the large data volume. As a result, this research suggests important implications to fill a gap in the literature regarding tourism geography, and to offer differential marketing strategies for the tourism marketers.

Literature Review

Online consumer reviews as reflection of service experiences

Understanding consumer experiences is a complex task because it is particularly intricate and thus challenging to generalize about this topic, which is uniquely personal. In particular, service experience evaluations involve a wide variety of amenities and service encounters that affect an individual's unique expectations and evaluations (Crotts, Mason, & Davis, 2009). Along with the competitive environment of the hospitality industry, it is vital for relevant businesses to identify ways to comprehend their consumers' experiences and to enhance satisfaction levels by exceeding expectations. As such, consumer satisfaction has been regarded as one of the prominent elements to measure overall competitiveness in the hospitality industry (Xiang, Schwartz, Gerdes, & Uysal, 2015).

Several methods have been applied to assess consumer (or visitor) experiences, such as survey methods (or visitor comment card), importance–performance analysis and open-ended interviews. The survey method has mainly been used for enhancing the generalizability of the results. However, this approach involves potential restrictions from not only a poor response rate (i.e., external validity issue), but also ambiguous measurements (i.e., internal validity issue) (Parasuraman, Zeithaml, & Berry, 1985). When developing a balance between the length of a survey and quality of the response data, it is still challenging to encompass comprehensive questions to include various attractions of destinations or hotels to visitors. Martilla and James (1977) initially proposed importance and performance analysis as an alternative to manage these issues. It has generally been used because of its ease of application and ability to show two dimensions directly compared within the same attributes (Oh, 2001). However, there is a problem concerning the utility of the method because the attributes should be predefined by the

researchers (Pritchard & Havitz, 2006). Alternatively, open-ended questions allow marketers to obtain rich responses from consumers, while they require substantial clumsy work to analyze the data and present the results, there are also challenges to infer data from a larger population (Xiang et al., 2015).

Once the limitations in the traditional methods were recognized, recent scholars in the study of hospitality and tourism have used an alternative method with online consumer review websites. Online reviews reflect consumption satisfaction with individual experiences of the services, and in turn they play an important role affecting the decision-making process for other consumers (Schuckert, Liu, & Law, 2015). It was found that four aspects of service experience (i.e., service satisfaction, service failure/recovery, customer dissatisfaction, and sense of belonging) are main motivators that lead consumers to write online comments (Cantallops & Salvi, 2014). In this vein, previous studies have demonstrated the associations between the directions of satisfaction or dissatisfaction and the focus of online consumer reviews (i.e., positive or negative) (see Cantallops & Salvi, 2014; Sun & Qu, 2011; Swanson & Hsu, 2009).

People have a propensity to share their concrete travel experiences on social media websites, from where they are able to plan (or anticipate) their departures, enroute experiences and the moments where they are consuming services with like-minded others (Utz, Kerkhof, & van den Bos, 2012). As such, people use a social media platform as a tool to express their feelings and share their ideas/opinions, which reflects realistic and honest chronicles of visitors' experiences (Nardi, Schiano, & Gumbrecht, 2004). Thus, online consumer reviews offer richer substance along with presence of online platforms, which allows people to indicate multiple facets of service experiences; for instance, locations, sleep quality, rooms, services, cleanliness (Park & Nicolau, 2017). Based on the value of consumer review mechanisms, current travelers

are likely to consider online reviews to assess the authentic experiences of staying in specific hotels before actually purchasing the services (Browning, So, & Sparks, 2013; Park & Nicolau, 2015).

There has been substantial literature on identifying factors that affect service satisfaction in the hotel industry, such as cleanness, price, facility, location, distance, room quality, food etc. (Choi & Chu, 2001; Xiang, et al., 2015). Among them, this paper particularly highlights importance of a situational factor, travel distance. In terms of construal level theory, geographical distance can determine how people think and make a judgement (Liberman & Trope, 1998). The detailed discussion of the travel distance in understanding service experiences will be described in the following section.

Distance and travel behaviors

The distance between two locations is an important attribute influencing the travel decision-making process (Nyaupane et al., 2003; Nicolau, 2008; Larsen & Guiver, 2013). Indeed, travel distance plays a vital role of inherent spatial dimensions in a tourist's decision making of destination choice (Nicolau, 2008). A number of research efforts in tourism have investigated the effect of distance on length of stay (Nicolau, et al., 2016), value of travel time (Walsh et al., 1990), motivation for a trip (Woodside & Dubelaar, 2002), destination choice (Adamowicz, Louviere, & Williams, 1994; Nicolau & Mas, 2006), re-visitation possibilities (Moutinho, & Trimble, 1991), place attachment (Nyaupane et al., 2003), sustainable behaviors in tourism mobility (Larsen & Guiver, 2013), travel expenditures (Marcussen, 2011), and activity participation (Cai & Li, 2009).

Reviewing the relevant literature, there seems to have three different arguments of which distance brings about negative, positive, and curvilinear effects on service experiences. In a negative context, the travelers regard the distance as a constraint or restriction (Nicolau, 2008), which is consistent with the conventional "gravity" model theoretically rooted in economic geography (Nyaupane et al., 2003). The gravity model, derived from Newton's law of gravity, argues that the interaction between objects is relatively connected to their masses as well as the square of the distance between them in an opposite way (Timmermans, 2001). Indeed, as distance increases, the place attachment decreases. Other than the geographic perspective, travelers perceive that the distance is a type of opportunity cost encompassing financial (e.g., transportation fares) and nonfinancial (e.g., time and effort) investment (Lee, Guillet, Law, & Leung, 2012; Rengert, Piquero, & Jones, 1999). That is, travelers are required to make a trade-off between their time spent on travel mobility and their time at the destination (Taylor & Knudson, 1973). In this case, the time it takes to travel to the site is assumed to be an implicit production cost, which refers to disutility of distance (Rosenthal, Loomis, & Peterson, 1984; Walsh et al., 1990).

From a positive perspective of the travel distance, leisure travelers are, in general, more flexible with their discretionary travel-time activities (Walsh et al., 1990), as opposed to commuters who have limited controls on choosing time to travel (e.g., during peak rush-hour traffic). In other words, the time spent on their mobility for leisure trips from their departure, across their route, and arrival at the destination may provide a positive value as part of the travel benefit rather than a cost (Catton, 1965). This suggests that travelers do not tend to regard their time spent moving to travel destinations as particularly onerous, nor attribute it to a high opportunity cost in their travel time (Moutinho & Trimble, 1991). Baxter (1979) found that the

journey itself, as a component of the tourism product, could give satisfaction in its own right so that, on occasions, longer distances are preferred. As fundamental motivation of tourism, people have a desire to visit new places and seek novelty experiences encompassing spatial mobility (Lee & Crompton, 1992), which refers to the "Ulysses factor". Anderson (1970) initially introduced the term of "Ulysses factor" expressing people's need for adventure as a motivational force stimulating them to do something extraordinary and include some degree of risk (Pearce, 2012). Wolfe (1970) consistently identified that the friction cost of travel distance could be reduced or even reversed when the idea that "the further people go, further they want to go" (Wolfe, 1972, p. 73) is considered. From an economic perspective, Nicolau (2008) demonstrated that distance can also bring about positive utility. Travelers who choose a faraway distance tend to use land transport instead of air flights due to the opportunities it allows them to see sundry sights on their way to the destination.

A non-linear (or curvilinear) relationship may also be considered in regards to distance and travel decisions. Distance decay has been regarded as one of the vital laws of geography, which suggests there is a distribution of ideas, technology, population, time, and distance on cultural or spatial interactions (Cai & Li, 2009). Indeed, distance decay exists in a pattern: as travel distance increases, demand for the destination declines exponentially (or a frictional effect on demand) (McKercher & Lew, 2003). A series of research studies conducted by McKercher and his colleagues (1998, 2003, 2008) identified that specific patterns of distance decay were particularly related to the travel context, such as effective tourism exclusion zones. That is, demand increases with distance, up to a certain level. After that threshold, demand decreases as distance increases. More specifically, the curve peaks closer to the origin and then declines exponentially following the shape of lognormal distribution as the perceived costs of travel

distance and time increase (Bull, 1991). This pattern suggests that people need to travel a minimum distance for a vacation in order to feel far away from their home in a sufficient way, and thus make an overnight journey worthwhile (McKercher & Lew, 2003). More importantly, the friction of distance is negligible after a certain point and then, it turns to be a favorable attribute of the benefits of the experience (Nyaupane et al., 2003; Nicolau, 2008). Accordingly, it can be argued that distance decay explains trip demand based on the "Ulysses factor" as well as proximity and associated costs (Lee et al., 2012).

Hypothesis Development

This study proposes that after holding other factors constant, the travel experiences of a tourist can vary according to his/her travel distance from origin, and this distance will further shape the levels of satisfaction where the traveler compares his/her expectations with the actual service experience encountered (Hsu, Huang, & Swanson, 2010). The construal level theory found that psychological distance that consists of physical distance (i.e., events in place versus events in faraway places) changes people's mental representations of events (Liberman & Trope, 1998). Based upon cognitive distance in tourism, Ankomah, Crompton, and Baker (1996) concluded that an individual's cognitive distance assessment influences preference of not only a destination as a core decision but also other sub-decisions within the decision-set (e.g., preference and choice of hotels, restaurants or attractions).

McKercher et al. (2008) stated that distance is considered to be a valid proxy variable that represents the latent experience of other elements; for instance, the willingness or ability to engage with different cultures (or novelty experiences). In other words, a travel place that is too proximate to the departure point would not engender a sense of getaway to meet the needs of a

pleasure trip (Lee et al., 2012). According to the "Ulysses factor", travelers would be more likely to have more positive travel experiences associated with the satisfaction they feel when they visit a place that is far away from their home (Nyaupane et al., 2003). With regard to the concept of psychological distance, some studies have implied the possibility of positivity bias when evaluating services under high-level construal (Henderson & Wakslak, 2010). That is, in a situation where travelers are placed at a certain geographical distance (with a high-level construal mindset), they are likely to focus on the pros in favor of an action and perceive positive aspects of experiences as being more salient. Thus, it can be argued that consumers who involve a long travel distance increases construal level and, as a result, are likely to form positive service experiences (leaving positive review comments) to the hotels they stayed in (Huang, Burtch, Hong, & Polman, 2016).

In contrast, there is another belief that travel distance is closely associated with costs, including time, energy and the money that consumers expend to purchase a service. Indeed, consumers who make rational choices should assess the transactional costs of time and money, relative to an increase in travel distance in order to maximize their benefits (Mohan & Thomas, 2012). In terms of the expectation–disconfirmation theory (see Oliver, 1997), long haul travelers who pay high monetary and non-monetary costs are likely to form higher levels of expectations in service consumption than short haul travelers. As a result, given the same service experiences encountered, long haul travelers are more likely to bring about a negative disconfirmation (performance < expectation) than travelers who undertake short haul trips. This argument is consistent to literature on consumer evaluation in shopping experiences. Travel distance has a negative influence on customer satisfaction about (Hsu et al., 2010), perceived quality of and attitude toward (Darley & Lim, 1999) a grocery shopping. Therefore, once a distance threshold is

bypassed, consumers become more aware of the costs associated with long haul travel than the enjoyment from the "Ulysses factor" and/or positive bias when evaluating hotel service experiences as a key attribute of travel experiences (Otto & Ritchie, 1996)

When the costs (distance) exceed the benefits (i.e., negative disconfirmation), people are likely to be dissatisfied with the consumption. It can be said that, after the threshold of distance, consumers might see an increased distance as a deterrent and this in turn devalues the overall service experiences (Clawson & Knetsch, 2013). Therefore, it can be hypothesized that (see Figure 1):

Hypothesis: There is an inverted U-shaped relationship between travel distance and tourist satisfaction.

(Please insert Figure 1 about here)

Research Methods

Data and model

We used the leading online review website, www.tripadvisor.com, to retrieve the hotel review data of guests. As an online hotel review specialist website, TripAdvisor is the industry leader with more than 60 million reviews archived (Levy, Duan, & Boo, 2013). Compared to traditional survey data, online hotel review data, as a type of UGC, covers a more representative sample based on respondents with actual hotel stays, and therefore, the data should be more objective and less biased by alleviating the so-called "laboratory effect" (Liu, Teichert, Rossi, Li, & Hu, 2017). The UGC data on TripAdvisor covers substantial information on the evaluation of

hotel experiences as well as the tripographic and demographic characteristics of individual reviewers, such as user's contribution level on TripAdvisor, their traveler type, and check-in month. The data set cover several measures reflecting the satisfaction during hotel stay, such as overall rating, location evaluation, service satisfaction, sleep quality, and value evaluation. Also, TripAdvisor users can disclose their home location in the user profile, which can be used to calibrate the travel distance to the city where the reviewed hotel is located (see Figure 2).

(Please insert Figure 2 about here)

Although the overall rating was dominantly used by previous studies to understand the satisfaction of hotel stays (Park & Nicolau, 2015; Schuckert et al., 2015; Zhang, Zhang, & Yang, 2016), we think the rating of service satisfaction is more appropriate in our research context. The overall rating consists of multiple dimensions such as room, location, and value (Xiang & Krawczyk, 2016), and these different dimensions may be entangled with different confounding factors that require extra control variables. For example, location evaluation is largely shaped by the hotels' accessibility to a wide variety of points of interests (Alkahtani, Xia, Veenendaaland, Caulfield, & Hughes, 2015), room satisfaction depends on the actual room type purchased, and value evaluation is contingent upon the actual room rate paid (Ye, Li, Wang, & Law, 2014). Unfortunately, these control variables were either unavailable or particularly challenging to obtain. Therefore, we just focus on the service satisfaction rating instead of the overall rating. Our sample consists of reviews from reviewers who checked in from July 2015 to June 2016, covering a total period of one year. The reason to keep the latest one-year data is twofold. First, we tried to reduce the within-hotel variation across the research period, and it is more realistic to assume the stability of service quality during a one-year time period. Second, because more

independent variables are likely to become statistically significant with a sample of extremely large size, we decided to keep the date set at a reasonable size to alleviate the "over-fitting" problem (Fan, Han, & Liu, 2014).

We selected hotel reviews in four cities located in different geographic areas of the United States to make the sample more geographically representative. New York City (NYC), located in the northeastern part of the US, is the most populated city in the nation. The city consists of five boroughs and is touted as the cultural and financial capital of the world. With its unique world-wide reputation of offering world-class cultural, historical, and business attractions, NYC becomes one of the most popular cities for tourists both domestic and international. The city of Los Angeles (LA) is the second largest US city and it is located in California, a western US state. By offering a plethora of tourism activities and year-long Mediterranean climate, the city has witnessed a boom of inbound tourist arrivals from the Asia–Pacific region as well as increasing domestic travels. The city of Chicago is the third-most populous city in the United States and the most populous city in the Midwest of the country. As one of the most visited US cities, Chicago is famous for a wide variety of cultural attractions and other urban activities that are particularly appealing to tourists. Last but not least, we chose the city of San Antonio (SA) from the south of the nation. Located in the state of Texas, SA is the seventh-most populated US city. With several major attractions such as The Alamo and River Walk, SA is able to attract a growing number of visitors. All these four cities offer a robust economy and convention/event facilities to support the business travel market. Table 1 presents the statistics for these four cities in terms of demographics, economy, and tourism. Note that TripAdvisor uses New York County, the Manhattan borough, to represent NYC when users search for "New York, NY." Actually, Manhattan houses most top-tier attractions such as the

United Nations Headquarter, Wall Street, several world renowned museums, and two-thirds of NYC hotels are located in Manhattan (Office of the New York State Comptroller, 2016). For other cities, TripAdvisor uses the administrative boundary of the city to define the location of hotels, and therefore, the geographical area of these cities is different from that of corresponding metropolitan statistical areas. For example, the boundary of LA city is much smaller than LA county and the Greater LA area.

(Please insert Table 1 about here)

The TripAdvisor hotel review data is of multiple levels by nature, and each single review is nested in the individual hotel. Therefore, the econometric model should be able to accommodate this multi-level structure. Moreover, the service rating is an ordinal measure, ranging from 1 (terrible) to 5 (excellent). We decided to apply a multi-level ordered logit model for empirical analysis (Yang, Mao, & Tang, 2017). In the model, we specify two levels embedded in the data, the reviewer level *i*, and the hotel level *j*. The proposed econometric model is specified as follows (Rabe-Hesketh & Skrondal, 2012):

$$\begin{aligned} y_{ij}^{*} &= \mathbf{x}_{ij}\beta + \mu_j + \varepsilon_{ij} \\ y_{ij} &= m \ \text{ if } \ \tau_{m-1} \le y_{ij}^{*} \le \tau_m \ \text{ for } m = 1, 2, .., 5 \end{aligned} \tag{1}$$

where y_{ij}^{*} is the latent outcome, based on which y_{ij} is the observed ordinal outcome of service rating from review *i* on property *j*; *i* indicates the review (the lower-level observation) and *j* indicates each individual hotel (the higher-level observation) that the review nested in; $\mathbf{x}_{ij}$ is a row vector of independent variables on the review and its reviewer. Moreover, μ_j denotes the hotel-specific effect of hotel *j* that captures unobserved characteristics, and they are realizations from a multivariate normal distribution with mean 0 and variance matrix Σ; ε_{ij} is an error

distributed as a logistic distribution that is independent of μ_j. The observed y_{ij} is determined from y_{ij}^* by the cut-points τ_1 through τ_4 to be estimated after assuming $\tau_0 = -\infty$ and $\tau_5 = +\infty$.

The empirical model we proposed takes full advantage of the multi-level structure of the online hotel review data set. More importantly, since many reviews are nested in a single hotel, the model is able to account for hotel-specific factors related to service satisfaction. To interpret the estimated coefficients β, we can either explain it as the marginal effect based on the latent outcome y_{ij}^* or use the concept of odds to understand the effects on the observed outcome y_{ij}. Odds are defined as:

$$odds_{>m|\le m}(\mathbf{x}_{ij}) = \frac{\Pr(y_{ij} > m \mid \mathbf{x}_{ij})}{\Pr(y_{ij} \le m \mid \mathbf{x}_{ij})} = \exp(\mathbf{x}_{ij}\beta - \tau_m) \tag{2}$$

By holding all other variables constant, the marginal effect of x_k on odds can be computed as $\exp(\beta_k)$, and x_k is the *k-th* independent variable in **X** with a coefficient of β_k. We utilize the full maximum likelihood estimation to estimate the proposed mixed-effect model and the likelihood function is specified as:

$$L(\beta, \tau, \Sigma) = (2\pi)^{-q/2} |\Sigma|^{-1/2} \int \exp\left\{ \sum_{i=1}^{n_j} \left[I_m(y_{ij}) \log\left(p_{ij} \right) \right] - u_j' \Sigma^{-1} u_j / 2 \right\} du_j \tag{3}$$

$$\text{and } p_{ij} = \Pr(y_{ij} = m) = \frac{1}{1 + \exp\left(-\tau_m + \mathbf{x}_{ij}\beta + u_j\right)} - \frac{1}{1 + \exp\left(-\tau_{m-1} + \mathbf{x}_{ij}\beta + u_j\right)} \tag{4}$$

Since there is no closed form for the integration, we use the mean–variance adaptive Gauss–Hermite quadrature to approximate (Skrondal & Rabe-Hesketh, 2004) when estimating the models.

Table 2 presents the definition of all dependent and independent variables incorporated in Equation 1. As discussed previously, we use service rating of each review(er) on the hotel stay as

the dependent variable, which is an ordinal variable with a scale from 1 to 5. The independent variable of major interests is Distance, which is the great-circle geographical distance (in 1,000 miles) between the reviewer's home city and the city where the reviewed hotel is located. We geocoded this distance based on the home city information disclosed in the reviewer's profile. To improve the efficiency of geocoding, we excluded international travelers and limited the reviewer's home city to 302 cities with a population more than 100,000 in the contiguous United States, which excludes cities in Hawaii and Alaska. Since TripAdvisor users usually did not highlight the country and state name in addition to their home city, we decided to delete all cities with names "Manchester", "Ontario", "Vancouver", and "Cambridge" to avoid miscoding as foreign cities. Similarly, we deleted cities of "Springfield" because of multiple major cities named Springfield in different US states. Also, we deleted all reviews with reviewers from the same city where the hotel is located. Figure 3 shows the spatial distribution of the hotel guest market of four cities, and it demonstrates that these cities' hotel industries cover a nationwide market. For other control variables, their definitions are presented in Table 2.

(Please insert Table 2 about here)

(Please insert Figure 3 about here)

Table 3 presents the descriptive statistics of variables in the empirical model. For the dependent variable, about 60% of guests left a rating of five for hotel service in these four cities. Only a total of 10% or even fewer guests rated service experiences to be poor (rating=2) or terrible (rating=1). The average value of service rating ranges from 4.149 in LA to 4.368 in Chicago. Regarding independent variables, our sample is dominated by three traveler types: couple travelers, business travelers, and family travelers. Although the percentages of these three

types are close in NYC, business travelers dominate the sample in LA and Chicago whereas family travelers prevail in SA. As for continuous independent variables, the average TripAdvisor contribution level (Expertise) is around two in all four cities, and higher in NYC and LA. The average travel distance (Distance) varies greatly. NYC has the largest average travel distance, which is 1,082 miles, suggesting that compared to the other three cities, NYC attracts hotel guests from a wider geographical range. Lastly, we estimated the correlation matrices of independent variables included for each city. Most coefficients are below 0.5, suggesting that a multi-collinearity problem does not exist in the model (Gujarati & Porter, 2010).

(Please insert Table 3 about here)

Results

Before evaluating the relationship between service rating and guests' travel distance, we estimated the distance decay curves (Zhang, Wall, Du, Gan, & Nie, 1999) for the four sampled cities. We regressed the log of visit rate (number of reviews from the origin city over its population) on the log of geographic distance (lnDistance) between the origin and destination cities. Table 4 presents the regression estimation results. The estimated coefficient of lnDistance is the distance decay parameter, and it is estimated to be −0.357 for NYC, −0.200 for LA, −0.766 for Chicago, and −1.229 for SA. All of them are statistically significant at the 0.01 level. Compared to the other two cities, the smaller distance decay parameters for NYC and LA suggest that these two mega cities are able to attract a large volume of domestic visitors from remote domestic markets to overcome barriers associated with long haul travel.

(Please insert Table 4 about here)

Figure 4 demonstrates the scatter plots between visit rates and travel distance as well as the estimated curve for the four cities. The slope of distance decay curve represents the magnitude of distance decay effect. As shown in the graph, the curve for LA is fairly flat, suggesting the limited role that distance plays in determining the domestic hotel demand to this city. Furthermore, we found that the curve nicely fits the pattern of scattered dots of Chicago and SA, suggesting that hotel visit rates are largely shaped by distance factors for these two cities.

(Please insert Figure 4 about here)

Table 5 presents the estimation results of the multi-level ordered logit model. Apart from the independent variables introduced previously, we also incorporated the quadratic term of Distance, Distance^2, to capture the non-linear effect of travel distance on service satisfaction. For the categorical variables, we set Traveler type=1 (couples) as the reference group. In the table, both Distance and Distance^2 are estimated to be statistically significant in NYC (Model 5), LA (Model 6), Chicago (Model 7), and SA (Model 8). The Wald test on the joint significance of these two variables confirmed the non-linear effect of travel distance on service rating. We also compared the model with the corresponding model without the quadratic term Distance^2, and the likelihood ratio test suggests statistical significance of the quadratic term in all four models. The positive coefficient of Distance and the negative coefficient of Distance^2 indicate an inverted U-shaped relationship: a positive relationship exists between service rating and travel distance up to an inflection point of distance, and after that point, a negative relationship prevails. Therefore, our research hypothesis is empirically supported. Based on the estimates of these two variables, we calculated the inflection point at the bottom of Table 5. In general, the inflection point

corresponds to a higher-than-median value of Distance, suggesting that the positive distance–satisfaction relationship characterizes more than half of observations. To visualize the effect, we first used Equation 4 to predict the probability of different ratings after setting other variables at their mean values and then calculated the predicted rating as the weighted sum of the rating and its predicted probability. We plotted out these predicted ratings over distances for four cities in Figure 5. These curves demonstrate an inverted U-shape, and the inflection point of this curve is slightly larger than the mid-point of distance for each city. In general, the shape of the curve is very similar between NYC and LA covering a more distant domestic hotel market, and it is also similar between Chicago and SA which rely on a less distant hotel market in the nation.

(Please insert Table 5 about here)

(Please insert Figure 5 about here)

Regarding control variables, the results show that compared to couple travelers (Traveler type=1), business travelers (Traveler type=2) are more demanding and reluctant to post high ratings for service in NYC, Chicago, and SA, and the same is true for family travelers (Traveler type=4) in LA and SA. More specifically, compared to couple travelers, the odds of a higher compared lower rating outcome is 24% lower (exp(−0.274)−1) for business travelers in NYC, 23% lower (exp(−0.267)−1) for travelers with friends in LA, 35% higher (exp(0.299)−1) for solo travelers in Chicago, and 20% lower (exp(−0.223)−1) for family travelers in SA. Expertise is estimated to be statistically significant and negative in all models, suggesting that reviewers with a higher expertise level tend more post a lower rating for hotel service. For one level increase in expertise level (Expertise), the odds of a higher compared lower rating outcome is lowered by 7.8% (exp(−0.0807)−1) in NYC, 4.1% (exp(−0.0423)−1) in LA, 5.1% (exp(−0.0519)−1)) in

Chicago, and 6.0% (exp(−0.062)−1) in SA, holding all other variables constant. This result is consistent with the findings of Zhang et al. (2016), which show that expertized reviewers are more demanding because of the higher expectations stemming from their travel experiences, and they might be more likely to post lower ratings to signal their status as an expert.

Conclusion and Discussion

In this paper, we estimated the effects of distance to the hotel from the traveler's residence on the service experience. Based upon the notion of online consumer ratings that reflect perceptions of service quality (Park & Nicolau, 2015), this study collected consumer review data from a travel social media website, including over 1,000 hotels located in NYC (19,705 consumer reviews), LA (4,373 reviews), Chicago (5,819 reviews), and SA (6,921 reviews). The results unveiled an inverted U-shaped relationship between travel distance and service experiences. Indeed, travelers appear likely to have higher service experiences when they travel further; however, the service quality starts to reduce when the distance passes an inflection point.

This result sheds light on concurrence of "Ulysses factor" and expectation-confirmation theory, opposed to literature on retailing that mostly shows a negative effect of travel distance on shopping/grocery experiences (Darley & Lim, 1999; Hsu et al., 2010). Given the fact that accommodations are part of vital attributes in travel experiences (Masiero, Nicolau, & Law, 2015), consumers who involve a long distance tend to form positive evaluations to their travel journey in general, and accommodation experiences in particular. This is because the certain level of travel distance facilitates for people meeting a novelty-seeking motivation that is a fundamental desire to travelers. Furthermore, construal level theory argues that how people think

and judge an object/event depends on psychological distance (Liberman & Trope, 1998). Indeed, with a high-level construal mindset, consumers consider more pros in favor of an event than cons (Eyal, Liberman, Trope, & Walther, 2004). This implies an occurrence of a positivity bias when assessing hotel service experiences under long travel distance.

On the other hand, increase of travel distance requires increase of financial and non-financial costs to be spent, leading to increase of service expectations. As a result, there would be more possibility to take place higher levels of expectations than ones of experiences (or benefits) obtained while staying a hotel (Pizam, Shapoval, & Ellis, 2016). This instance generates the negative service satisfaction of the hotel.

In terms of theoretical implications, there are numerous studies that investigate the role of online consumer reviews in understanding travel decision-making processes and assessing tourism firm performance (Liu & Park, 2015). However, attempts to integrate the key features of tourism, which is travel distance in this study, have been restricted. More importantly, the findings of this research identified a dual role of travel distance (Nicolau, 2008) with regard to online social media context. Travel is a discretionary leisure-time activity (Walsh et al., 1990). That is, time of departure and length of travel distance may be determined to provide a positive value of travel time, and travelers would not perceive the time spent on movement as especially onerous, as opposed to general commuters who are unable to make their own choices. Therefore, travel distance performs as an attraction in itself. On the other hand, the travel distance becomes a dissuasive factor after a threshold, which negatively affects travel experiences. This finding is associated with a concept of distance decay, arguing that as distance increases, demand declines exponentially (McKercher & Lew, 2003). Since travelers require an investment of time, money,

and effort, they trade off tourism experiences against the cost spent. A negative disconfirmation where expectation exceeds performance is otherwise likely to occur (Oliver, 1997).

This study, particularly, identified the threshold where the direction of the relationship has been changed: approximately 1,300 miles for NYC and LA as well as about 950 miles for Chicago and SA. Thus, this study suggests that distance can be described as an implicit obstacle in a specific case of a distance beyond the threshold (McKercher et al., 2008). To the authors' knowledge, this is the first study that has demonstrated the presence of a distance decay pattern within the online social media context. That is, the findings of this study demonstrate that distance is closely related to the guests' experiences of the accommodation located at specific destinations.

This study has also identified different service experiences of accommodation according to different travel characteristics. For example, couple travelers within the travel companion and less expert travelers tend to perceive higher service experiences than other segments when contributing online content to social media websites. With regard to the nature of the heterogeneous travelers, the types of travel companions and past experiences of using online review websites are important indicators that determine travel experiences. Consistent with the travel literature regarding past experiences (Zhang et al., 2016), the findings of this research identified that the more trip experiences that the travelers have, the more their expectations increase and this leads to forming less satisfaction from the services.

This paper has several practical implications. Service managers are suggested to develop different marketing and operational strategies for domestic travelers along with different travel distances (Lee et al., 2012). That is, travelers who are too close to the destination might not generate a sense of getaway, which brings with it less service satisfaction from the

accommodation when compared to travelers who reside at a relatively far distance. Thus, service managers at the accommodation need to offer novel experiences to specific travelers (Ankomah et al., 1996), so as to render a physical and mental transition from one place to another (Larsen & Guiver, 2013). In a similar vein, the managers need to provide the travelers outside the threshold with higher service quality than those travelers within the threshold from the internal source market. This should be done because travelers tend to seek accommodation that compensates for the psychological, physical, and monetary costs associated with longer trips. In practice, the design of dynamic travel packages (e.g., combining accommodation with popular event and attraction tickets) for visitors from places too close and places faraway would be a useful strategy to meet their various needs and, thus, enhance their perceived values when purchasing travel products (or services) (Mohan & Thomas, 2012).

The results of our study can be tempered by some limitations. First, due to different IT penetration rates in different age groups, the online review data could over-represent some populations like the younger generation whereas under-represent others such as the senior population. Second, geographic distance can be slightly different from travel distance contingent upon the different types of transport the tourist uses. Also, some literature suggests that travel time can be more effective to represent the effort of a tourist to overcome travel obstacles. Further research efforts are recommended to incorporate the information regarding travel time as an alternative to test our hypothesis. It is also important to extend the context of the research into international tourism by taking into account different countries and cultures as well as price levels.

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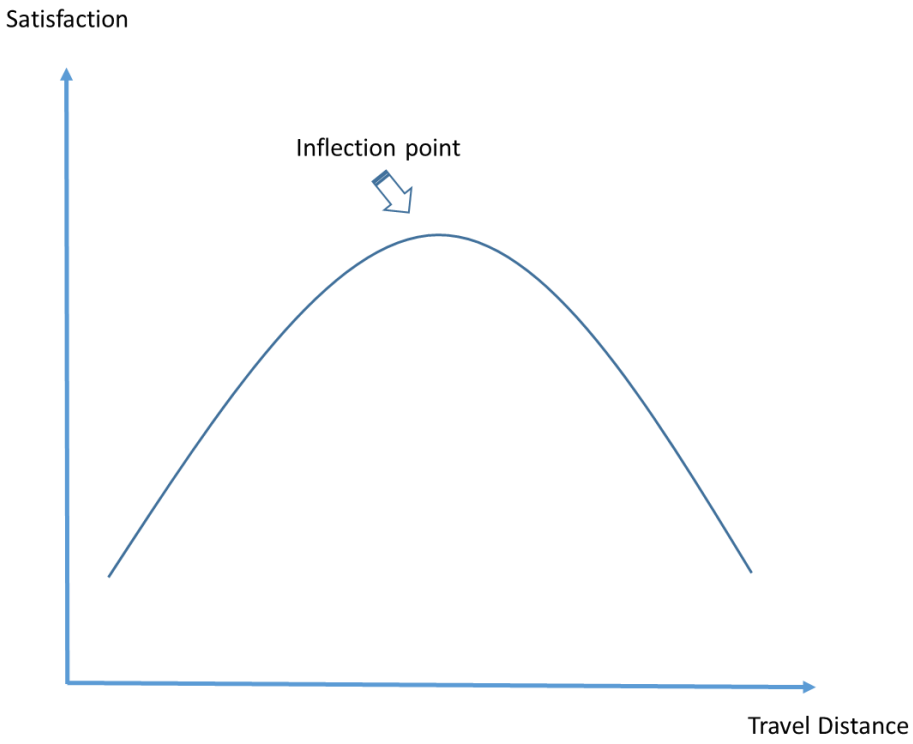

Fig. 1. A proposed model

Fig. 2. Example of a hotel review on TripAdvisor

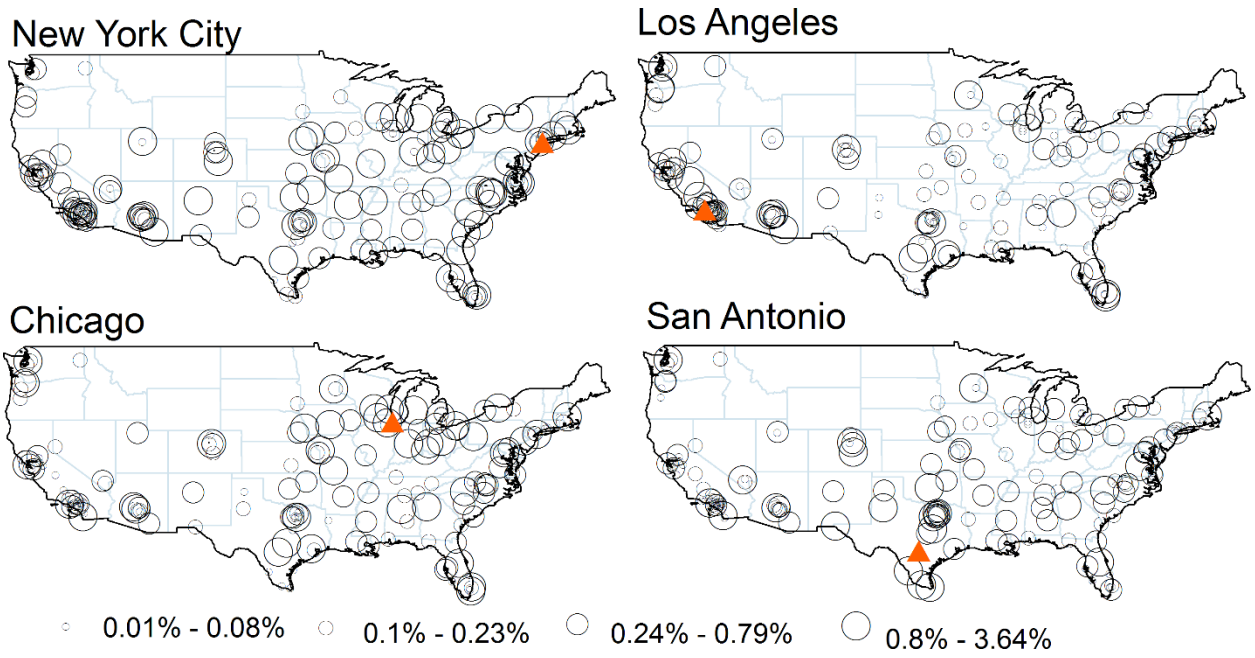

Fig. 3. Geographic pattern of lodging markets for cities.

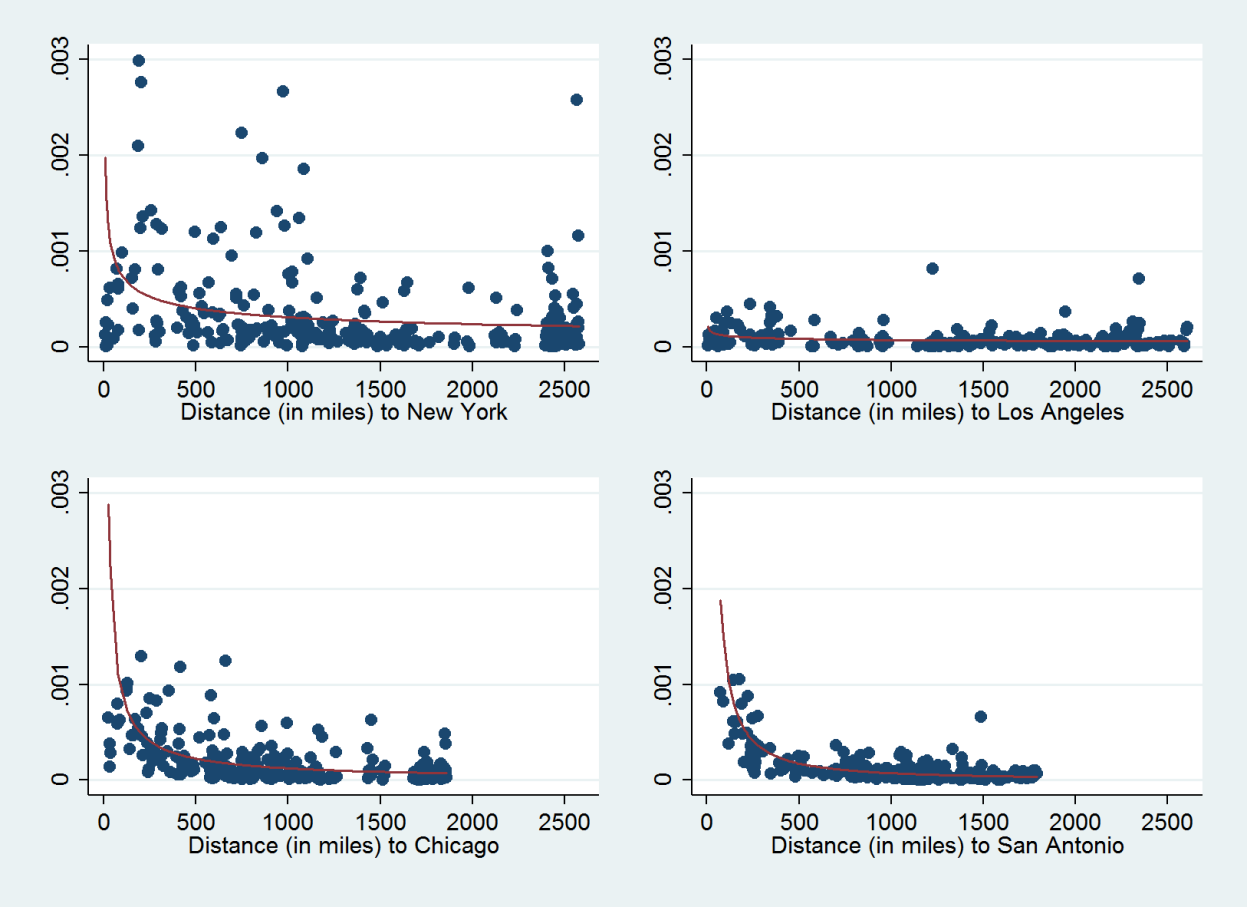

Fig. 4. Distance decay curve of cities

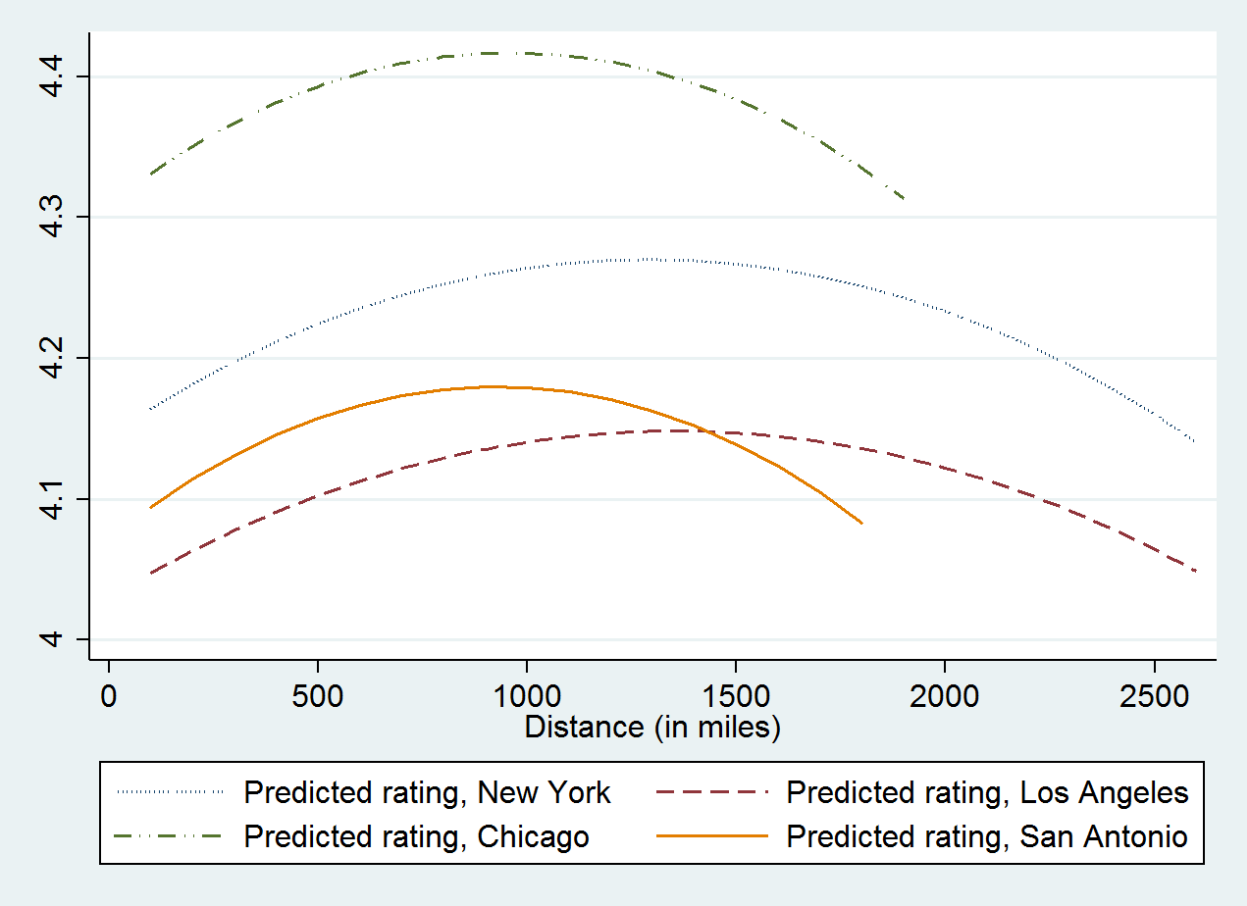

Fig. 5. Estimated inverted-U-shaped curves of distance effect on service ratings for sampled cities.

Table 1

Demographic, economy, and tourism statistics of four cities

	New York	Los Angeles	Chicago	San Antonio	Data Sources
Land area (2015)	302.6 sq mi	468.7 sq mi	227.6 sq mi	460.9 sq mi	United States Census Bureau (USCB)
Population (2015)	8,550,405	3,971,883	2,720,546	1,469,845	USCB
Population rank (2015)	1	2	3	7	
State	New York	California	Illinois	Texas	
Corresponding MSA	New York-Newark-Jersey City, NY-NJ-PA Metropolitan Statistical Area	Los Angeles-Long Beach-Anaheim, CA Metropolitan Statistical Area	Chicago-Naperville-Elgin, IL-IN-WI Metropolitan Statistical Area	San Antonio-New Braunfels, TX Metropolitan Statistical Area	USCB
MSA population (2015)	20,182,305	13,340,068	9,551,031	2,384,075	USCB
Tourist arrivals (2015)	60 million	45.5 million	52 million	31 million	Thomson Reuters, Discover Los Angeles, City of Chicago, Visit San Antonio
Number of hotels (2015)	477	347	188	359	TripAdvisor
Number of things to do (2015)	3,614	1,394	1,651	559	TripAdvisor
Average hotel room rate (2015)	$254	$175	$172	$124	Hotels.com Hotel Price Index

Table 2

Variable definitions for empirical analysis

Name	Definition
Service rating	Rating of service quality posted the reviewer on TripAdvisor: (1). terrible, (2). poor, (3). average, (4). very good, (5). excellent.
Distance	Geographical distance (in 1,000 miles) between reviewer's home city and the hotel.
Traveler type	Reviewer's traveler type during the travel. Five types of travelers are available: (1). family travelers, (2). couple travelers, (3). solo travelers, (4). business travelers, and (5). travelers with friends.
Expertise	Contribution/expertise level of the reviewer on TripAdvisor (https://www.tripadvisor.com/TripCollectiveFAQ). Six levels are available from level 1 to level 6 according to the TripCollective points received, which are evaluated by the reviewer's contribution to various activities on the website. We assign level 0 for any reviewers whose contribution level does reach level 1.
Month	Month of a reviewer's stay in the reviewed hotel

Table 3
Descriptive statistics of variables.

	New York		Los Angeles		Chicago		San Antonio	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Service rating								
1	789	4.00	242	5.53	143	2.46	386	5.58
2	753	3.82	216	4.94	208	3.57	333	4.81
3	1,953	9.91	567	12.97	537	9.23	691	9.98
4	3,870	19.64	971	22.20	1,407	24.18	1,294	18.70
5	12,340	62.62	2,377	54.36	3,524	60.56	4,217	60.93
Traveler type								
1=Couples	5,562	28.23	1,012	23.14	1,395	23.97	1,491	21.54
2=Business	5,303	26.91	1,395	31.90	2,121	36.45	2,214	31.99
3=Solo	1,271	6.45	318	7.27	276	4.74	240	3.47
4=Family	5,368	27.24	1,261	28.84	1,436	24.68	2,534	36.61
5=With friends	2,201	11.17	387	8.85	591	10.16	442	6.39
Month								
Jan	1,360	6.90	309	7.07	279	4.79	440	6.36
Feb	1,421	7.21	323	7.39	362	6.22	511	7.38
Mar	1,699	8.62	450	10.29	555	9.54	710	10.26
Apr	1,730	8.78	416	9.51	589	10.12	708	10.23
May	1,724	8.75	387	8.85	577	9.92	689	9.96
Jun	1,583	8.03	315	7.20	520	8.94	757	10.94
Jul	1,791	9.09	441	10.08	620	10.65	680	9.83
Aug	1,640	8.32	381	8.71	614	10.55	573	8.28
Sep	1,455	7.38	319	7.29	487	8.37	526	7.60
Oct	1,862	9.45	409	9.35	501	8.61	493	7.12
Nov	1,514	7.68	325	7.43	358	6.15	415	6.00
Dec	1,926	9.77	298	6.81	357	6.14	419	6.05
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Service rating	4.331	1.063	4.149	1.161	4.368	0.963	4.246	1.159
Expertise	2.137	2.082	2.259	2.172	1.574	2.015	1.649	2.041
Distance	1.082	0.834	1.049	0.870	0.759	0.539	0.555	0.483

Table 4
Estimation results from distance decay analysis

	Model 1	**Model 2**	**Model 3**	**Model 4**
	New York	Los Angeles	Chicago	San Antonio
lnDistance	-0.357***	-0.200***	-0.766***	-1.229***
	(0.104)	(0.037)	(0.076)	(0.065)
constant	-6.761***	-8.977***	-4.948***	-1.815***
	(0.740)	(0.239)	(0.506)	(0.429)
N	286	256	257	277
R-sq	0.087	0.093	0.286	0.441

(Notes: *** indicates significance at the 0.01 level, ** indicates significance at the 0.05 level, * indicates significance at the 0.10 level. Robust standard errors are presented in parentheses.)

Table 5
Estimation results of the multi-level ordered logit model

	Model 5	**Model 6**	**Model 7**	**Model 8**
	New York	Los Angeles	Chicago	San Antonio
Distance	0.361***	0.303**	0.512**	0.406**
	(0.067)	(0.137)	(0.207)	(0.197)
Distance^2	-0.140***	-0.112**	-0.267**	-0.219*
	(0.025)	(0.057)	(0.106)	(0.123)
Traveler type=2	-0.274***	-0.246***	-0.175**	-0.0553
	(0.045)	(0.092)	(0.081)	(0.075)
Traveler type=3	-0.0903	-0.122	0.299**	0.0311
	(0.068)	(0.129)	(0.142)	(0.160)
Traveler type=4	-0.00133	-0.174**	0.116	-0.223***
	(0.042)	(0.088)	(0.091)	(0.065)
Traveler type=5	-0.00925	-0.267**	0.298***	-0.0681
	(0.060)	(0.121)	(0.112)	(0.117)
Expertise	-0.0807***	-0.0423**	-0.0519***	-0.0620***
	(0.013)	(0.019)	(0.016)	(0.015)
τ_1	-3.432***	-3.045***	-3.947***	-3.274***
	(0.384)	(0.160)	(0.203)	(0.150)
τ_2	-2.702***	-2.318***	-2.995***	-2.549***
	(0.387)	(0.158)	(0.193)	(0.137)
τ_3	-1.716***	-1.271***	-1.923***	-1.667***
	(0.403)	(0.153)	(0.189)	(0.137)
τ_4	-0.593	-0.140	-0.549***	-0.612***
	(0.401)	(0.157)	(0.180)	(0.147)
Monthly effect	Controlled	Controlled	Controlled	Controlled
var(*u*)	0.687*	0.666***	0.402***	0.825***
	(0.366)	(0.113)	(0.079)	(0.118)
N(reviews)	19705	4373	5819	6921
N(hotels)	397	221	136	252
AIC	41551.3	10513.4	12261.1	15235.9
BIC	41732.8	10660.2	12414.5	15393.3
ll	-20752.7	-5233.7	-6107.6	-7595.0
Wald test of non-linearity (df)	32.72(2)***	5.27(2)*	6.32(2)**	4.64(2)*
LR test (df)	27.41(1)***	3.36(1)*	7.25(1)***	2.68(1)*
Inflexion point	1.287	1.353	0.960	0.925

(Notes: *** indicates significance at the 0.01 level, ** indicates significance at the 0.05 level, * indicates significance at the 0.10 level. Robust standard errors are presented in parentheses. Estimates of monthly dummies are not presented for purposes of brevity. Wald test of non-linearity indicates the test on the joint significance of Distance and Distance^2, and LR test indicates the likelihood ratio test compared to the model without Distance^2.)