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The impact of social media reviews on restaurant performance: The moderating role of excellence certificate

Woo Gon Kim[a,*], Jun (Justin) Li[b,1], Robert A. Brymer[b,2]

[a] International Center for Hospitality Research & Development, Dedman School of Hospitality, College of Business, Florida State University, B4116 University Center, 288 Champions Way, Tallahassee, FL 32306, USA
[b] Dedman School of Hospitality, College of Business, Florida State University, B4116 University Center, 288 Champions Way, Tallahassee, FL 32306, USA

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ABSTRACT

A limited number of studies have been conducted that identify the major drivers of restaurant financial performance. In addition, how an excellence certificate moderates the relationship between determinants and restaurant financial performance is still unknown. The purpose of this study is to examine the influence of social media reviews and operating efficiency metrics on restaurant financial performance and to explore the moderating role of an excellence certificate. The findings of this study reveal that the number of online reviews customers make has a significant positive impact on restaurant performance. Additionally, customer overall rating, guest served per labor hour, and the food quality offered by the restaurant influence restaurant performance. The moderating effect of the restaurant excellence certificate between the number of reviews and restaurant performance are found to be significant. For a restaurant with an excellence certificate, a larger number of reviews or a better overall rating promotes net sales, guest counts, and average check to a larger degree compared to a restaurant without an excellence certificate. Consequently, in order to enhance a restaurant's top line, restaurant operators with an excellence certificate should keep the number of customer comments high and positive.

1. Introduction

Based on the information provided by the National Restaurant Association (NRA, 2014), 2015 will become a landmark year for the U.S. restaurant industry—the sales volume will exceed $709 billion, the number of restaurant establishments will amount to 1 million, and the number of employees will reach 14 million. Moreover, the NRA predicts that the number of employees working in the restaurant industry will grow to 15.7 million people in the next decade. The above statistics clearly indicate the importance of the restaurant industry in terms of its sheer size and its contribution to job creation in the U.S. economy. However, the NRA also states that restaurant owners are facing various challenges despite the growth and prosperity of the restaurant industry. For instance, one of the most difficult operational tasks for the viability of restaurant operators is to maintain its customer counts goal. A number of studies have demonstrated that the salient restaurant attributes customers perceive and employees' productivity are important precursors for accomplishing high customer satisfaction, which in turn will lead to a high sales volume and the profitability of restaurant operation (Gupta et al., 2007; Yim et al., 2014).

Due to the unpredictable meal duration and the fixed pricing structure in the restaurant industry, the application of revenue management to the industry is a challenge, but implementing revenue management strategies, such as demand forecasting, in the restaurant business has recently emerged as an important competitive strategy for enhancing revenue. Revenue enhancement also depends on many other factors, and identifying the determinants of restaurant financial performance is an important topic to explore. However, since collecting data on determinants and restaurants' performance metrics is a challenging task, the extant literature on this issue is very limited. Hence, this study identifies the key determinants of restaurant performance.

Previous studies have identified the effects of traditionally salient restaurant attributes on the financial performance of the restaurant business (see Table 1); however, the determinants in the previous literature were not comprehensive enough. Therefore, this study incorporates traditionally salient attributes (e.g., food, service, value, atmosphere, and guest overall rating), emerging

* Corresponding author. Tel.: +1 850 644 8242; fax: +1 850 644 5565.
E-mail addresses: wkim@business.fsu.edu (W.G. Kim), jli13@fsu.edu (J. Li), rbrymer@business.fsu.edu (R.A. Brymer).
[1] Tel.: +1 850 566 3983; fax: +1 850 644 5565.
[2] Tel.: +1 850 644 8241; fax: +1 850 644 5565.

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Table 1
Restaurant attributes and their outcomes.

Author(s)	Industry type	Data type	Sample size	Analytical method	Chief purposes	Major findings
Koo et al. (1999)	Restaurant	Primary data	86 respondents	Conjoint analysis	To identify a list of restaurant attributes that are important for restaurant-goers in deciding where to dine	Location, type of food, variety of food, uniqueness, car park, price, quality or taste of food, decoration, and service
Susskind and Chan (2000)	Restaurant	Primary and secondary data	63 restaurants	Correlation analysis	To examine the underlying determinants or drivers of a successful full-service restaurant operation	Three attributes of interest (dress code, parking, and outside dinning); Three uncommon attributes (internet presence, late night menu, and entertainment)
Heung (2002)	Restaurant	Primary data	180 questionnaires	ANOVA	To understand customers' behaviors in relation to customers' perceptions of important restaurant attributes in selecting an American theme restaurant in Hong Kong	Food quality, servers' attitudes, value for money, atmosphere, and word-of-mouth were the five important restaurant dimensions considered by consumers in selecting an American theme restaurant
Johns and Pine (2002)	Foodservice	Secondary data	N/A	Content analysis	To summarize food service consumer research	Four areas were identified: (research of survey, experimental, economics and geography, sociology, and anthropology)
Park (2004)	Fast food industry	Primary data	279 patrons	Factor and correlation analysis	To investigate the relationships between consumer values of eating-out and the importance of fast food restaurant attributes in Korea	Korean consumers choose fast food restaurants more by hedonic, not utilitarian, values of eating-out
Sulek and Hensley (2004)	Irish-pub-style full-service restaurant	Primary data	239 diners	Regression analysis	To investigate the relative importance of food, physical setting, and service in the context of a full-service restaurant	Three factors (food, physical setting, and service) explained about half of the variability in a regression model of customer satisfaction
Baek et al. (2006)	Fast food restaurant	Primary data	632 college students	Conjoint analysis	To investigate Korean and Filipino college students' perceptions of the fast food restaurant selection criteria with respect to the attributes they feel are important	Koreans and Filipinos viewed menu price as the most important attribute. The next important attributes in Korea were brand, food related factors, and service- and hygiene-related factors, while in the Philippines, they were food-related factors, service- and hygiene-related factors, and brand
Saad Andaleeb and Conway (2006)	Full service restaurant industry	Primary data	85 questionnaires	Regression analysis	To determine the factors that explain customer satisfaction in the full service restaurant industry.	Customer satisfaction was influenced most by responsiveness of the frontline employees, followed by price and food quality (in that order). Physical design and appearance of the restaurant did not have a significant effect.
Gupta et al. (2007)	Restaurant	Primary data	N/A	Regression analysis	To quantify the links between customer satisfaction, repeat-purchase intentions, and restaurant performance	Restaurants paying attention to food quality, appropriate cost, and attentive service have the greatest chance to increase guests' intent to return
Namkung and Jang (2008)	Mid-to-upper scale restaurants	Primary data	287 diners	Logistic regression	To identify key quality attributes that significantly distinguish highly satisfied diners from non-highly satisfied diners	Appealing food presentation, tasty food, spatial seating arrangement, fascinating interior design, pleasing background music, reliable service, responsive service, and competent employees are important attributes in contributing to the high satisfaction of diners
Kim and Moon (2009)	Theme restaurants	Primary data	208 surveys	SEM	To explore the relationships among physical environment, customers' emotional and cognitive responses, and behavioral intentions	Perception of the servicescape directly influences customer emotions and, in turn, indirectly affects their behavioral intentions

Table 1 (*Continued*)

Author(s)	Industry type	Data type	Sample size	Analytical method	Chief purposes	Major findings
Liu and Jang (2009)	Chinese restaurants in the U.S.	Primary data	284 questionnaires	IPA	To investigate American customers' perceptions of Chinese restaurants in The U.S.	Food quality, service reliability, and environmental cleanliness are three pivotal attributes to creating satisfied customers and positive post-dining behavioral intentions
Chen and Hu (2010)	Coffee outlet industry	Primary data	834 respondents	Multiple regression analysis	To investigate empirically how the determinant attributes of coffee quality, service, food and beverage, and extra benefits influenced customer-perceived value in the coffee outlet industry	Factors of determinant attributes of service quality significantly influenced functional and symbolic dimensions of perceived value with the former being related to coffee quality, service, and food and beverage, whereas the latter is positively related to coffee quality and F&B
Author(s)	Industry type	Data type	Sample size	Analytical method	Chief purposes	Major findings
Marković et al. (2010)	Restaurant	Primary data	156 questionnaires	Paired sample t-test	To establish the significance of the difference between perceived and expected service quality	Expectation scores are higher than perceptions scores, which indicate a low level of service quality
Pantelidis (2010)	Restaurant	Primary data	2471 customer comments	Content analysis	To identify the factors that are most salient in a guest's evaluation of a restaurant (positive/negative comments, food, service, ambience, price, menu, décor, total comments, and food/drink types)	Customers consider food, service, ambience, price, menu, and decor (in that order) when reflecting on their experiences
Zhang et al. (2010)	Restaurant	Secondary data	1242 customer comments	Regression analysis	To evaluate whether consumers' reviews and professional editors' reviews have different influences on the behavior of online users	Consumer ratings about food, environment, and service are positively associated with the popularity of restaurants. Editor reviews have a negative relationship with consumers' intention to visit a restaurant's webpage
Jeong and Jang (2011)	Restaurant	Primary data	201 responses	SEM	To examine which restaurant experiences trigger customers to engage in positive electronic word-of-mouth (eWOM), where the quality of restaurant service (food quality, service quality, atmosphere, and price fairness) is the antecedent of eWOM communication	Restaurants' food quality positively influences customers to spread positive eWOM, motivated by their desire to help the restaurant; a superior atmosphere in restaurants elicits positive eWOM motivated by a concern for others
Author(s)	Industry type	Data type	Sample size	Analytical method	Chief purposes	Major findings
Parsa et al. (2012)	High end and low end restaurant	Primary data	380 respondents	Multiple regression analysis	To explore the relationship between restaurant attributes and consumers' willingness to patronize	The results indicated that this relationship is not linear thus demanding further investigation
Kwok and Yu (2013)	Restaurant	Secondary data	982 Facebook messages	ANOVA	To examine what kind of messages gained the most likes and comments on Facebook	Photos and statuses (text only) receive more likes and comments than links (containing a URL) and videos
Yim et al. (2014)	Restaurant	Secondary data	185 customer comments	Ordinary least square regression analysis	To examine the important attributes influencing average customer meal prices in restaurants	Food quality, décor, floor level, types of cuisine, parking facilities, private dining settings, franchising, and the number of blogger reviews (e-WOM) have significant effects on restaurants' average meal prices
Lai (2015)	Tea restaurants	Primary data	382 customers	SEM	To evaluate the roles of perceived value, customer satisfaction, and affective commitment as they mediate the effect of service quality on customer loyalty	Perceived value does not have a significant effect on customer loyalty for these restaurants

social media reviews (e.g., number of online reviews), a competitive ranking of subject unit relative to comp sets, and an operational efficiency measure (e.g., guests served per labor hour). In terms of measuring the financial performance of the restaurant business, this study also adopts comprehensive performance measures, incorporating customer counts, average check, and net sales. Therefore, this study investigates the influences of comprehensive restaurant-specific attributes on restaurant financial performance.

In addition, this research takes into consideration a seemingly important factor affecting restaurant financial performance. Sparks et al. (2013) argued that hospitality firms with awards or certificates exert a positive influence on consumers' beliefs about credibility, quality, and corporate social responsibility. Peiró-Signes et al. (2014) found that guests give higher satisfaction ratings to hotels with the environmental management certification (ISO 14001) than to the ones without the certification. Thus, examining the moderating role of certification on the relationship between determinants and restaurant financial performance is worthy of exploration. As a result, this study investigates the role of an excellence certificate, which is regarded as a moderating variable, on the relationship between predictors and restaurant financial performance.

The objectives of this study are three-fold: (1) to identify the relatively new and unexplored determinants of restaurant performance from a broad perspective (e.g., emerging social media reviews, a competitive ranking of subject unit relative to comp sets, and an operational efficiency measure); (2) to test the effects of the above determinants on financial performance of the restaurant business; and (3) to examine the moderating effect of an excellence certificate on the relationship between determinants and performance.

2. Literature review and hypotheses

2.1. The relationship between the number of online reviews and restaurant performance

With expanding customer involvement in online reviews, researchers have delineated the online reviews attributes from a variety of perspectives, for example, the number of reviews (Dellarocas et al., 2007; Yim et al., 2014), the response to negative reviews from hotel management (Kim et al., 2015), the positive online reviews of a hotel's product (Ye et al., 2009), and the overall valence of a set of reviews on a hotel (positive or negative) (Sparks and Browning, 2011). Research has identified the number of reviews a product/service receives from customers as one of the most critical review attributes (Dellarocas et al., 2007; Duan et al., 2008).

Numerous empirical studies across different industries have already investigated the influence of the number of reviews on firm performance (Dellarocas et al., 2007; Ghose and Ipeirotis, 2011). Significant progress has been made in understanding how the number of guest reviews influence various outcomes such as hotel revenues (Kim et al., 2015), hotel sales and booking volume (Ye et al., 2009), sales of online games (Zhu and Zhang, 2010), box office revenues (Duan et al., 2008), movie sales (Liu, 2006), book sales (Chevalier and Mayzlin, 2006), and price premium (Zhang et al., 2010).

Previous scholars have given explicit attention to the outcomes of number of reviews as is well documented in the marketing literature. For example, Dellarocas et al. (2007) investigated the influence of the number of users' online reviews on movie revenue. The results of their findings indicated that the quantity of online reviews can be effectively used to predict future movie sales. Liu (2006) investigated the relationship between feedback from online users and movie sales and found out that the number of online reviews has a strong relationship with weekly movie sales. In addition, Chevalier and Mayzlin (2006) examined the relationship between book reviews and book sales and discovered that more online book reviews leads to higher sales of books since the large quantity of book reviews is a signal for the wider popularity of that book. Zhu and Zhang (2010) also found that the quantity of reviews is a direct precursor to the sales volume of online games.

On the other hand, hospitality literature to date has also provided conceptual and empirical studies that discuss the relationship between online reviews and hotel performance. For example, Ye et al. (2009) regarded the number of online reviews as the predictor of the quantity of hotel booking since the high number of reviews posted is directly related to the increase in hotel booking. Anderson (2012) investigated the impact of online review information such as ratings and number of reviews, on hotel guests' price premium. In addition, Park and Allen (2013) argued that hotel managers needed to explore the relationship between online review information and hotel performance metrics. Kim et al. (2015) further stated that hotels should manage the number of reviews as a critical part of their hotel marketing. However, researchers have conducted a dearth of studies that examines the relationship between number of reviews and restaurant financial performance. An exception is a study conducted by Yim et al. (2014) that showed the number of blogger reviews (e-WOM) strongly influenced restaurants' average meal prices. However, they further pointed out that future researchers needed more empirical evidence to support the positive impact of the number of reviews on restaurant financial performance. According to the abovementioned discussions, this study makes the following hypothesis:

H1. The number of online reviews is positively associated with restaurant performance.

2.2. The relationship between the rankings and firm performance

Researchers view the relative market share as a proxy for relative competitive advantage or a firm's competitive position (Hansen and Wernerfelt, 1989). Specifically, Hansen and Wernerfelt (1989) identified a firm's competitive position measured by the relative market share as a predictor of a firm's performance and confirmed the relative market share is a significant driver of the overall firm performance of Fortune 1000 firms. Relative market share is a variable that is widely applied to the field of strategic management. Based on the relative market share, one can identify the degree of success and the market position of a brand or a company (Farris et al., 2010). In addition, one can compare the market share of a brand or a company with that of its competitors. In this way, managers are able to identify their relative positions in various products/service markets (Farris et al., 2010).

One can operationalize relative market share in several ways, and, specifically, researchers can use the ranking of companies in a competitive set to measure the relative market share. For instance, TripAdvisor, the top worldwide tourism website, received over 200 million online reviews from international travelers. By incorporating elements such as the word of mouth of guests and professional opinions to generate hotel and restaurant rankings, TripAdvisor provides a platform for better understanding the relative market share of hotels and restaurants.

Although firm rankings are quite important, a limited number of empirical studies employed rankings as a predictor of organizational performance. Abbott and Doucouliagos (2003) investigated the impact of university ranking on a university's performance measured in efficiency. They found that universities with the

highest ranking tended to have higher scores of scale efficiency, which is equivalent to higher performance. On the other hand, Esty and Porter (2005) examined the influence of the ranking of countries' environmental regulations on the performance of nations, measured by the competitiveness and growth of the economy. Their findings demonstrated that a country with a high ranking in environmental regulations is most likely to have strong national competitiveness.

To our knowledge, previous studies have not investigated the influence of firm rankings on the performance of hospitality organizations. Rather, previous hospitality literature focused on identifying the determinants of performance, including selection attributes (Park, 2004; Parsa et al., 2012; Sulek and Hensley, 2004; Susskind and Chan, 2000; Weiss et al., 2005), perceived service quality (Chen and Hu, 2010; Kim and Moon, 2009; Marković et al., 2010), customer satisfaction (Gupta et al., 2007; Namkung and Jang, 2008), and customers' online reviews (Kwok and Yu, 2013; Pantelidis, 2010). Drawing on previous literature, it is expected that the higher the ranking of a restaurant relative to its competitive set, the higher the unit's market share; as a result, its financial performance will be better. Thus, the following hypothesis is formulated below:

H2. Restaurant rankings are positively associated with restaurant performance.

2.3. The relationship between the operating efficiency and restaurant performance

Over the last few decades, more and more researchers have used the operation efficiency measurement as an indicator for reflecting how well respective organizations manage resources (Sanjeev, 2007). For example, numerous studies have examined the influence of operation efficiency on organizational performance across different industries including telecommunications (Uri, 2001), public service (Hammond, 2002), nursing (Nunamaker, 1983), insurance (Mahajan, 1991), and banking (Jemric and Vujcic, 2002; Sherman and Ladino, 1995). These studies confirmed the positive relationship between operation efficiency and firm performance.

Hospitality researchers have also developed many operating efficiency measures across different sectors. The following are examples of efficiency measures: room occupancy percentage (Tracey and Hinkin, 2008), restaurant seat turnover (Muller, 1999), meal duration time (Hummel and Murphy, 2011), the average number of customers served by a server (Kokkinou and Cranage, 2013), and the percentage of labor and food cost (Davidson et al., 2010). Reynolds and Thompson (2007) stated that improving operation efficiency by effectively allocating the limited financial resources in the restaurant business is critical for accomplishing revenue maximization. Reynolds (1998) argued that as one of the efficiency measures, labor hours play a vital role in evaluating the productivity of foodservice organizations. Reynolds (2003) further demonstrated that efficiency measures, including the training time of employees, the number of servers in a specific period, and labor hours, are predictors of restaurant productivity. Based on the abovementioned information, the hypothesis listed below is formulated:

H3. Restaurant operating efficiency is positively associated with restaurant performance.

2.4. The moderating effect of an excellence certificate on the relationship between determinants and restaurant performance

The International Organization for Standardization (ISO) is an organization that sets global standards for the requirements and specifications of quality management, information, and process. The certifications, which are issued by ISO, guarantee that the documentation process, service process, producing procedure, and management system meet the demand of quality assurance and standards. As is widely acknowledged by scholars, ISO certifications can improve the performance of enterprises (Zakuan et al., 2012). Abdul-Aziz et al. (2000) also confirmed that certifications, especially ISO certifications, allow firms to accomplish higher standardization, leading to higher firm performance.

Besides the popular standard of ISO, previous studies have explored the role of different types of certificates. For example, Van der Lans et al. (2001) found that EU certificates of origin label and region-of-origin cue can affect the regional product preference through the perceived quality. An accredited certification serves as a reliable signal of high product/service quality for an organization. For example, TripAdvisor awarded the certificate of excellence to outstanding accommodations and restaurants based on travelers' overall evaluations.

Recent hospitality literature has shown that obtaining an accredited certificate can influence consumers' attitudes and hotel performance. After conducting a survey of guests at 6850 Spanish hotels, Peiró-Signes et al. (2014) found that guests gave higher satisfaction ratings to hotels with environmental management certification (ISO 14001) than to the ones without certification. Sparks et al.'s (2013) study demonstrated that the presence or absence of an environmental certification can influence hotel guests' attitudes toward the hotel.

In addition, Lee et al. (2014) found a significant moderating effect of hotel food quality and service quality on the relationship between perceived value and attitudinal/behavioral loyalty. Priya and Anthuvan (2012) also disclosed that environmental certification acted as the moderator in the relationship between product quality and export performance (e.g., average annual sales, growth rates, and overall profitability) in the Indian leather industry. Since the excellence certificate serves as a proxy for service quality of any organization, we propose that the effect of customer evaluation, such as the number of online reviews and restaurant rankings on firm performance, could be strengthened if a restaurant acquired an accredited certification, which consumers perceive means the restaurant is more capable of delivering higher service quality. When service quality is perceived to be low, especially for a service business heavily relying on service itself as a competitive advantage, the service brand will be exposed to a higher risk of deteriorating the credibility of its service commitment to customers, which in turn will have a negative impact on a brand's performance (He and Li, 2011; Yang et al., 2015). Thus, we expect that the magnitude of customer evaluation on hotel performance is stronger for hotels that have an excellence certificate.

In addition, Zhang et al. (2014) argued eco-certified U.S. hotels maintain a higher operational efficiency than those without eco-certification, and higher operational efficiency leads to a higher financial performance. On the basis of the above empirical evidence, we expect that similar results will hold in the restaurant industry. The influence of operational efficiency on restaurant performance will be higher for restaurants with excellence certification than those without certification. When a restaurant has an excellence certificate, which is equivalent to guests' superb perceived service quality, we expect that the impact of operational efficiency on restaurant performance will be strengthened. Thus, the fourth hypothesis is developed as follows:

H4. Excellence certificate moderates the effect of determinants (number of online reviews, restaurant rankings, and operational efficiency) on restaurant performance.

3. Methodology

3.1. Sample and data collection

Researchers approached a regional restaurant chain company, which operates more than 70 restaurants in 16 states in the United States, and explained the purpose of this study. We requested, from top management, internal operational metrics, for example, the operating efficiency and restaurant performance of its full-service restaurants under the strict condition of confidentiality about corporate identity. The top management of the firm agreed to provide their metrics and to help researchers conduct interviews with their managers to identify the most significant predictors of restaurant performance. We performed focus-group interviews, via video and telephone conferences, with a total of ten managers in the restaurant chain that had positions such as regional manager, director of sales and marketing, director of finance, and director of data/information processing. Based on their feedback, we hand collected a wide range of determinants that were not available from their internal metrics to test the proposed research hypotheses. The secondary data was collected from leading online travel intermediaries, such as TripAdvisor, Urbanspoon, and Foursquare, and included traditional restaurant attributes (e.g. food, value, service, and atmosphere), number of reviews, overall rating, regional ranking, and excellence certificates of all sample restaurants.

3.2. Measures

This study identified three independent, three dependent, five control, and one moderating variable and measured all variables as single-item scales in order to test the relationship between key restaurant metrics and restaurant performance. All the variables and their sources and measures are demonstrated in Table 2. Independent variables were number of reviews, restaurant ranking, and operational efficiency (GPLH), which were coded into continuous variables. The number of reviews was measured by the total number of reviews from four social media sites: TripAdvisor, Yelp, FourSquare, and UrbanSpoon. We defined restaurant ranking as a percentile and measured it as the ratio of each unit's ranking to the total number of competitive restaurants in a specific market area. For example, a lower value of percentile demonstrated a higher level of restaurant ranking. Operational efficiency was measured by guests per labor hours (GPLH), which was calculated as the guest counts divided by each server's labor hours. Control variables, such as food, service, value for money, atmosphere, and overall rating, were measured by a single-item five-point Likert scale from TripAdvisor.

On the other hand, this study used restaurant performance as a dependent variable and measured it by net sales, guest counts, and average check. Net sales was measured by the amount of restaurant sales after deducting returns, allowances for damaged or missing goods, and any discounts allowed. Guest counts were measured by the reception volume of restaurants. Average check was measured by dividing total guest counts from restaurant net sales. In addition, this study adopted the natural logs of the values for the dependent variables instead of the original raw values since the natural log conversion improved model fit and direct interpretability (Kerkhoff and Enquist, 2009). Also, TripAdvisor awarded an excellence certificate to outstanding restaurants. We dummy coded the excellence certificate and adopted it as a moderating variable.

3.3. Data analysis

First, we illustrated the descriptive statistics to give a detailed picture of all the variables. Second, to identify the relationships among the control, independent, and dependent variables, we performed a Pearson correlation analysis. Third, we performed a series of hierarchical multiple regressions to test the research hypotheses. To analyze the data for this study, we adopted IBM SPSS version 22.0.

Table 2
Description of variables selected for the study.

Variables	Data source	Measures
Independent variables		
Number of reviews	TripAdvisor, Yelp, FourSquare, and UrbanSpoon	Total number of reviews from these four social medias.
Restaurant ranking	TripAdvisor	The ratio of each unit's ranking to the total number of competitive restaurants in a specific market area
GPLH	A restaurant chain	Guest counts divided by labor hours per server used
Control variables		
Food	TripAdvisor	The 5-point rating scale for food
Service	TripAdvisor	The 5-point rating scale for service
Value for money	TripAdvisor	The 5-point rating scale for value for money
Atmosphere	TripAdvisor	The 5-point rating scale for atmosphere
Overall guest rating	TripAdvisor	The 5-point rating scale for overall guest rating
Dependent variables		
Net sales	A restaurant chain	The amount of sales generated by a restaurant after the deduction of returns, allowances for damaged or missing goods, and any discounts allowed
Guest counts	A restaurant chain	Reception volume in restaurants
Average check	A restaurant chain	Net sales/guest counts
Moderating variable		
Certificate of excellence	TripAdvisor	1 if the restaurant has a certificate; 0, otherwise

4. Results

4.1. Description of the study

Table 3 illustrates the descriptive statistics. On average, the number of reviews each unit received was 113. The ratings for food, service, and atmosphere were very close, and the mean values were approximately 4.10. As a result, we inferred that guests were satisfied with those dimensions. Nevertheless, the average of value for money was 3.68, and that was relatively lower than the ratings of other attributes (e.g., food, service, and atmosphere). The findings imply that each unit should improve value-for-money perceptions from their guests. Customers reported the mean value of overall rating at 4.05. In terms of each unit's average competitor ranking in the market area, the restaurant ranked in the top 11%, indicating that guests on certain social media networks positioned this restaurant brand in the nearly top 10% of the competitive set. The average of GPLH, which refers to a server's productivity or efficiency measure, was 5.27. The average logarithm of total net sale reached 6.35, and that of guest count was 5.01. We applied the original raw values of the average check in this research. In addition, approximately half of the restaurants obtained an excellence certificate, and the well-balanced distribution indicates that excellence certificate can serve as a moderating variable (Li and Yang, 2015; Liu et al., 2015a, 2015b).

Table 3
Descriptive statistics of the independent, control, and dependent variables.

Variables	Mean	SD	Min.	Max.	Skewness	Kurtosis
Independent variables						
Number of reviews	113.36	104.03	23	435	1.63	1.74
Restaurant ranking	.11	.08	.01	.35	1.06	.58
GPLH	5.27	.54	3.77	6.20	.82	.97
Control variables						
Food	4.05	.26	3.30	4.40	1.69	2.98
Service	4.07	.21	3.30	4.30	2.03	2.49
Value for money	3.68	.40	3.00	4.30	.33	1.67
Atmosphere	4.06	.19	3.30	4.30	1.95	2.13
Guest overall rating	4.05	.21	3.52	4.46	.50	.36
Dependent variables						
Net sales	6.35	.13	6.07	6.60	.01	.52
Guest counts	5.01	.12	4.68	5.20	.41	.11
Average check	21.92	2.32	18.66	31.70	1.83	2.04

4.2. Correlation analysis among variables

Table 4 shows the correlation coefficients of the eleven variables, including the independent, control, and dependent variables. Number of reviews was positively related to net sales (.65, $p < .01$), guest counts (.55, $p < .01$), and average check (.56, $p < .01$). Out of the four salient restaurant selection attributes (food, service, atmosphere, and value), food was closely related to net sales (.59, $p < .01$), which indicates that the higher the customers' perception of food quality, the higher the restaurant net sales. In addition, service has a strong correlation with the three dependent variables: net sales (.43, $p < .01$), guest counts (.25, $p < .05$), and average check (.26, $p < .05$). Thus, the positive correlation coefficients indicates that the higher the consumers' perception of service quality, the higher the restaurant financial performance. However, value and atmosphere did not have significant relationships with the three dependent variables (net sales, guest counts, and average check). In other words, the enhancement of guests' perception of value for money and atmosphere does not directly relate to restaurant financial performance. Also, in terms of restaurant ranking, there was a strong negative correlation between each unit's ranking and net sales (−.49, $p < .05$), guest counts (−.51, $p < .05$), and average check (−.50, $p < .05$). As mentioned earlier, a lower value of percentile indicated a higher level of restaurant ranking. Thus, we expect the relationship between restaurant ranking and financial performance to be negative. In addition, there was a strong positive correlation between GPLH and net sales (.41, $p < .01$), guest counts (.34, $p < .05$), as well as average check (.32, $p < .05$). Thus, the higher the employees' productivity, the higher the financial performance. In addition, guest overall rating was positively related to net sales (.37, $p < .05$) and guest counts (.46, $p < .01$), indicating that, the higher the guests' overall evaluation, the higher the restaurant sales and guest counts.

4.3. Hypotheses test

In order to examine the impact of the independent variables (number of reviews, restaurant ranking, and GPLH) on restaurant performance and the moderating role of the excellence certificate, we applied hierarchical regression analyses. The results of the analyses are shown in Table 5. The analyses consisted of three steps. First, we examined the direct effect of the independent and control variables on restaurant performance. Second, we dummy-coded the moderator of excellence certificate. Third, we entered interaction terms (e.g., independent variables × excellence certificate). For each of the three dependent variables, net sales, guest counts, and average check, we conducted separately the three-step hierarchical regression analyses.

In order to detect whether multicollinearity existed, we calculated the variance inflation factor (VIF). Multicollinearity was not a concern since the values were much lower than the threshold value of 10, which ranged from 1.254 to 4.058. In order to find any obvious violations of normality assumptions, we analyzed the normality of the error term of the variate by using a graph to examine the normal probability plots of residuals. The almost linear residual plot and normally distributed error terms implied that symmetrical and nearly normal distributions existed. In addition, by examining the skewness and kurtosis value, we inspected the univariate normality. Univariate kurtosis was less than 3.1, and univariate skewness was less than 2.7 (see Table 3), which was much lower than the threshold values of 5.0 for skewness and kurtosis (Kline, 2005). Consequently, we came to the conclusion that the sample data did not violate the normality assumption.

Table 5 illustrates the hierarchical multiple regression results for three restaurant performances. Step 1 shows that the number of reviews strongly influenced net sales, guest counts, and

Table 4
Correlation estimates.

Variables	*V*1	*V*2	*V*3	*V*4	*V*5	*V*6	*V*7	*V*8	*V*9	*V*10	*V*11
Number of reviews (*V*1)	1										
Food (*V*2)	.23	1									
Service (*V*3)	.06	.30*	1								
Value for money (*V*4)	.18	.35*	.40*	1							
Atmosphere (*V*5)	.20	.33*	.31*	.45**	1						
Restaurant ranking (*V*6)	−.28	−.22	−.37*	−.41**	−.41**	1					
GPLH (*V*7)	−.02	.03	.10	.13	.01	−.31*	1				
Guest overall rating (*V*8)	.19	.36*	.32*	.31*	.28	−.13	.30*	1			
Net sales (*V*9)	.65**	.59**	.43**	.12	.14	−.49**	.41**	.37*	1		
Guest counts (*V*10)	.55**	.15	.25*	.19	.15	−.51**	.34*	.46**	.74**	1	
Average check (*V*11)	.56**	−.12	.26*	.15	.19	−.50**	.32*	−.20	.41**	.12	1

* Indicates statistical significance at $p < .05$ level (2-tailed).
** Indicates statistical significance at $p < .01$ level (2-tailed).

Table 5
Hierarchical multiple regression results for restaurant performances.

Standardized coefficients (β)	Net sales	Guest counts	Average check
Step 1			
Independent variables			
Number of reviews	.27** (2.32)	.31** (2.38)	.28** (2.01)
Restaurant ranking	−.28** (−2.43)	−.14(−1.01)	−.15(−.82)
GPLH	.31** (2.33)	.22** (2.04)	.23* (1.77)
Control variables			
Food	.25** (1.98)	.19** (1.99)	.27** (1.98)
Service	.13(1.53)	.16(1.61)	.19(1.64)
Value for money	.07(.58)	.06(.51)	.03(.14)
Atmosphere	.12(1.23)	.08(.68)	.21(1.39)
Guest overall rating	.26** (2.26)	.17* (1.65)	.25** (1.96)
R^2	.29	.31	.27
F	7.34**	6.51**	5.01**
Step 2			
Independent variables			
Number of reviews	.24** (2.06)	.30** (2.42)	.31** (2.13)
Restaurant ranking	−.22** (−1.96)	−.08(−.76)	−.15(1.62)
GPLH	.20* (1.94)	.26** (1.96)	.18* (1.65)
Control variables			
Food	.13(1.06)	.22* (1.77)	.22* (1.74)
Service	.16(1.20)	.15(.92)	.14(1.53)
Value for money	.06(.45)	.02(.13)	.04(.17)
Atmosphere	.13(.89)	.10(.54)	.22(1.46)
Guest overall rating	.17(1.43)	.21* (1.75)	.19* (1.68)
Excellence certificate	.23** (2.27)	.28** (2.01)	.32** (2.47)
R^2	.03	.02	.02
ΔF	8.25**	8.03**	6.35**
Step 3			
Independent variables			
Number of reviews	.22** (1.97)	.26** (2.33)	.23* (1.92)
Restaurant ranking	−.26** (−2.01)	−.14(−1.61)	−.20* (−1.67)
GPLH	.18(1.62)	.21** (1.99)	.14(.83)
Control variables			
Food	.19* (1.67)	.17* (1.77)	.03(.49)
Service	.06(.35)	.08(.45)	.16(.89)
Value for money	.04(.28)	.11(.59)	.02(.41)
Atmosphere	.03(.24)	.07(.38)	.05(.54)
Guest overall rating	.20* (1.94)	.18* (1.95)	.15(.86)
Moderating effects			
Number of reviews × Certificate	.29** (2.12)	.15* (1.75)	.32** (2.16)
Restaurant ranking × Certificate	−.14(−1.47)	−.14(−1.60)	−.15(−.87)
GPLH × Certificate	.12(1.43)	.11(.64)	.19(1.63)
R^2	.07	.04	.05
ΔF	7.30**	8.36**	4.66**

* Indicates statistical significance at $p < .05$ level (2-tailed).
** Indicates statistical significance at $p < .01$ level (2-tailed).

average check in a positive and direct way ($\beta = .27, .31, .28$, $p < .01$, respectively). Thus, the enhancement of number of reviews does directly improve restaurant financial performances. This finding provides a powerful support for H1. There was a negative correlation between restaurant ranking and net sales ($\beta = -.28$, $p < .01$). However, restaurant ranking was not closely related to restaurant guest counts ($\beta = -.14$, $p > .05$) and average check ($\beta = -.15$, $p > .05$). Hence, a higher restaurant ranking does lead to higher restaurant guest counts and average check. Therefore, H2 was only partially supported. H3 was supported by the fact that GPHL directly affected net sales ($\beta = .31$, $p < .01$), guest counts ($\beta = .22$, $p < .01$), and average check ($\beta = .23$, $p < .05$). In other words, delivering products or services to guests in the most cost-effective manner possible can enable a restaurant to achieve higher profit margins or be more successful in highly competitive markets. It is interesting to see that among the four traditionally salient attributes, only food ($\beta = .25, .19, .27$, $p < .01$) had a significant impact on restaurant financial performance. Thus, offering high quality food results in a higher level of restaurant performance.

In step 2, we entered the restaurant's excellence certificate into model 1 to check the presumption for its moderating role. It was important to ensure in this step that the restaurant excellence certificate was another significant predictor of restaurant performance. The excellence certificate had a positive influence on net sales, guest counts, and average check ($\beta = .23, .28, .32$, $p < .01$, respectively). The incremental predictive power of the excellence certificate on net sales, guest counts, and average check was 3%, 2%, and 2%, respectively, and all three were statistically significant at the level of .01.

In step 3, we entered three interaction terms (number of reviews × excellence certificate, restaurant ranking × excellence certificate, GPLH × excellence certificate). Out of the three, the interaction variable (number of reviews × excellence certificate) had the most significant effect on restaurant net sales ($\beta = .29$, $p < .01$) and average check ($\beta = .32$, $p < .01$). Thus, compared to restaurants without an excellence certificate, the larger number of reviews had a stronger positive effect on net sales and average check in restaurants with certification. However, the two interaction variables (restaurant ranking × excellence certificate; GPLH × excellence certificate) were not significant predictors of restaurant performance. As a result, H4 was marginally supported.

5. Discussion and implications

It is vital for restaurateurs to know the major influencing factors of a restaurant's financial performance. The current study makes a number of contributions to the understanding of the way in which comprehensive determinants relate to restaurant financial performance. These contributions are discussed below.

5.1. Theoretical implications

The major theoretical contributions of this study are threefold. First, the number of reviews had a significantly positive influence on all three elements (net sales, guest counts, and average check) of restaurant financial performance. Previous studies have confirmed that number of reviews are significant predictors of hotel performance (Kim et al., 2015; Ye et al., 2009), movie sales (Duan et al., 2008), and retail sales. However, there is a dearth of studies that identify online reviews as an important determinant of restaurant financial performance, partly due to the challenge of collecting online review and performance data from restaurants. In particular, restaurants generally have much smaller capacities and guest bases than hotels that offer both sleeping room and meal services; therefore, it does take long for restaurant managers to collect critical mass of guest comments data. In addition, small and medium size restaurant units rarely have the luxury to access the data or fund personnel to trace guests' online review information. On the other hand, property hotel managers do receive rich online review data from their corporate chain and manage guest online reviews in order to enhance their overall guest experience. Considering the fact that large restaurant firms just implemented the collection of online review information, examining the relationship between online reviews and restaurant performance is a timely and worthy research endeavor even if significant progress has been made for better understanding the role of online reviews for explaining hotel performance since progress still needs to be made in regards to restaurant research. To the best of our knowledge, this study is the first one to explore how the number of online reviews directly influences comprehensive restaurant financial performance, incorporating sales, guest counts, and average check. Compared to traditional forms of purchasing, guests trust

online reviews as much as personal recommendations, so they read online reviews before visiting a restaurant. The high number of online reviews indicates that a restaurant has produced an ardent discussion among a number of restaurant guests. Namely, the large number of reviews can reflect restaurant popularity, which in turn has a direct effect on restaurant financial performance. Thus, this finding contributes to the extant restaurant literature by demonstrating number of reviews as one of the salient predictor of restaurant financial performance.

Second, company ranking as a determinant of firm performance has received limited attention in the business field. Even though we found that relative market share was a significant determinant of firm performance, the empirical evidence of ranking as a determinant of company performance has been rarely found in the field of business. Thus, the inclusion of a ranking component to explore restaurant settings is relatively new. To the best of our knowledge, no hospitality researchers have considered ranking as a predictor of performance. The results indicate that restaurant ranking did significantly contribute to the predication of restaurant performance. Thus, we assume that the higher a restaurant's ranking, the higher the unit's relative market positioning, leading to its higher net sales.

Third, this study confirmed the moderating effect of excellence certificate between number of reviews and restaurant financial performance. Restaurants with an excellence certificate experienced an increase in revenue, customer counts, and average check as more comments emerged, but restaurants without an excellence certificate did not experience this increase. As more restaurant comments occurred, more guests were willing to visit more often and pay price premium for a restaurant with an excellence certificate. In other words, restaurants with excellence certificates can command a higher average check and more frequent patronage behavior, which in turn helps increase its sales. This idea was supported by Sparks et al. (2013), who noted that there was a significant association between certification (e.g., award logos and credentials) and customer beliefs, which eventually influence business practices.

5.2. Managerial implications

The current study provides practical insights for restaurant operators who would like to improve their top line. First, the higher the number of online reviews, the better the restaurants' performance. To create buzz and to learn from target customers, restaurateurs should consider implementing a customer incentive system that would encourage customers to share their feelings and dining experiences on leading social media sites. For example, restaurants can offer rewards (e.g., membership points) to customers who post reviews of restaurant products and services, rate service quality, and ask questions or voice concerns directly to restaurants through social media platforms. The number of online customer comments plays an important role in electronic word-of-mouth and is especially effective for many of the younger generations, including millennials/generation Y who would prefer to use online media rather than traditional offline media. Therefore, to make the food décor, restaurant surroundings, and service quality visible to younger generations, clients who have no dining experience with the restaurants, managers should make full use of platforms such as Facebook, Twitter, YouTube, and Instagram. Last but not least, to promote a positive atmosphere and build relationships of trust with customers, restaurants should also recruit personnel to specifically handle social media interactions. Proper handling of these interactions in a satisfactory manner can result in the eye-catching and high incremental online customer repurchase intention and word of mouth.

Second, restaurant ranking also has a significant impact on restaurant performance. Traditionally, restaurateurs have been well aware that some traditional attributes, including food, décor, value, and service, influence customer satisfaction and restaurant performance. However, a majority of restaurant operators do not understand how restaurant ranking, relative to their restaurants' competitive set in a given market area, affects their financial performance. Therefore, restaurant operators' resource allocation, in terms of time and money, have been devoted to traditional restaurant attributes to improve their competitiveness, but they may be neglecting improving overall rankings in the market area. In order to make proper strategic decisions based on their limited resources and spend marketing dollars effectively, relative to their competitors in the market area, it is essential for restaurants to keep track of their ranking in the market area. In the long run, if restaurateurs are able to maintain their restaurants' high ranking relative to their competitive set in the market area, they will be able to accomplish a competitive advantage, which will help them increase revenue and generate a higher return on investment.

Third, the findings also support that there is a positive relationship between restaurant operating efficiency and performance. The findings show that the higher a restaurant's operating efficiency, the higher its net sales and guest counts. The findings are consistent with those of Reynolds (1998, 2003). In order to maintain a strong performance, a restaurant has to have efficient operating procedures because "without them, the quality of your products and services decrease, you lose track of inventory and your overall bottom-line suffers" (Michelle, 2015). Restaurants with high operating efficiency are more likely to increase customer traffic and its performance by offering the most efficient services to customers. For example, restaurateurs can greatly benefit from advanced information technology to improve their operating efficiency, which this study measures by server's productivity. With the help of local positioning technology, such as RFIDs (radio-frequency identification), waiters can use notepaper to easily find customers who have already ordered (Zhu et al., 2012). In this way, waiters will not waste time looking for the table where they should deliver dishes to, and they will have more time to do actual delivery, improve operational efficiency, diminish operation cost, and increase average check. Chen (2013) proposed that the order system could be applied to build a performance standard for improving kitchen efficiency. As a very important and measurable indicator in restaurants, kitchen efficiency is closely linked with restaurant servers' productivity (Chen, 2013). Kitchen efficiency not only affects the preparation of food but also has an effect on guests' meal duration. For instance, suppose there is a delay during the meal production process, guests have to stay longer on the premise. In other words, if a superior kitchen inefficiency cannot be maintained, it translates into longer food preparation time, which leads to an increase in average guest meal duration and lower server productivity. Therefore, the new order system technology facilitates aligning restaurant servers' productivity with a restaurant's overall strategy of efficiency.

Last, third-party excellence certification means much more than a restaurant merely has a printed paper or card signed by some authority disclosing the restaurant's expertise. Rather, certification is a process with the comprehensive measures to provide the best way for restaurants to compete with their rivals. The desire to start and go through this process is the most valuable part of excellence certification; it shows a restaurant's determination and ability to complete a series of evaluations. Companies without third-party certification need to always show exceptional ability (e.g., unique flavor dishes, competent service, and professional interactions with guests online) or ensure the selection authority that they are more competent than their rivals in the region. Competitive edge keeps changing, and restaurants may lose it over time, so sustainability is the key. Therefore, restaurant chain companies and restaurant operators need to improve service quality and the innovation level

in menu development to maintain their competitive edge due to changing customer demand and competition.

6. Limitations and future research directions

There are, inevitably, some limitations in our study. In the first place, we collected cross-sectional data, regardless of the influence of time, since we obtained the data at the same time. Future researchers could check whether the current year's restaurant performance is significantly influenced by last year's online comments, business ratios, or ranking. Therefore, in the future, researchers could conduct a longitudinal study in order to describe the influences of these attributes on restaurant financial performance.

Second, the measurement of restaurant operating efficiency needs to be expanded. In this study, we measured the operating efficiency only by average number of customers served by each waiter. Future researchers may use other indexes, for example, labor hours, number of servers during a given shift, time spent training each employee, average time spent at a table, and seat turnover by meal period or by day in order to make the measurement of restaurant operating efficiency more accurate.

Finally, researchers have to be prudent when they generalize the study results since this study focused on one high-end restaurant. Future researchers need to extend this research in order to test if the same results hold true for different sectors of the foodservice industry, for example, quick service, fast casual restaurants, and casual dining restaurants. In addition, future studies should investigate whether restaurant certification moderates these relationships.

References

Abbott, M., Doucouliagos, C., 2003. The efficiency of Australian universities: a data envelopment analysis. Econ. Educ. Rev. 22 (1), 89–97.

Abdul-Aziz, Z., Chan, J.F.L., Metcalfe, A.V., 2000. Quality practices in the manufacturing industry in the UK and Malaysia. Total Qual. Manage. 11 (8), 1053–1064.

Anderson, C.K., 2012. The impact of social media on lodging performance. Cornell Hospitality Rep. 12 (15), 4–12.

Baek, S.H., Ham, S., Yang, I.S., 2006. A cross-cultural comparison of fast food restaurant selection criteria between Korean and Filipino college students. Int. J. Hospitality Manage. 25 (4), 683–698.

Chen, P.T., Hu, H.H., 2010. How determinant attributes of service quality influence customer-perceived value: an empirical investigation of the Australian coffee outlet industry. Int. J. Contemp. Hospitality Manage. 22 (4), 535–551.

Chen, S., 2013. Culinary Resolutions, Week 4: Maximize Your Kitchen, Retrieved from ⟨http://www.popsugar.com/food/How-Make-Kitchen-More-Efficient-26935424⟩.

Chevalier, J.A., Mayzlin, D., 2006. The effect of word of mouth on sales: online book reviews. J. Mark. Res. 43 (3), 345–354.

Davidson, M.C., Timo, N., Wang, Y., 2010. How much does labour turnover cost? A case study of Australian four-and five-star hotels. Int. J. Contemp. Hospitality Manage. 22 (4), 451–466.

Dellarocas, C., Zhang, X.M., Awad, N.F., 2007. Exploring the value of online product reviews in forecasting sales: the case of motion pictures. J. Interact. Mark. 21 (4), 23–45.

Duan, W., Gu, B., Whinston, A.B., 2008. Do online reviews matter?—An empirical investigation of panel data. Decis. Support Syst. 45 (4), 1007–1016.

Esty, D.C., Porter, M.E., 2005. National environmental performance: an empirical analysis of policy results and determinants. Environ. Dev. Econ. 10 (4), 391–434.

Farris, P.W., Bendle, N.T., Pfeifer, P.E., Reibstein, D.J., 2010. Marketing Metrics: The Definitive Guide to Measuring Marketing Performance. Pearson Education.

Ghose, A., Ipeirotis, P.G., 2011. Estimating the helpfulness and economic impact of product reviews: mining text and reviewer characteristics. IEEE Trans. Knowl. Data Eng. 23 (10), 1498–1512.

Gupta, S., McLaughlin, E., Gomez, M., 2007. Guest satisfaction and restaurant performance. Cornell Hotel Restaurant Admin. Q. 48 (3), 284–298.

Hammond, C.J., 2002. Efficiency in the provision of public services: a data envelopment analysis of UK public library systems. Appl. Econ. 34 (5), 649–657.

Hansen, G.S., Wernerfelt, B., 1989. Determinants of firm performance: the relative importance of economic and organizational factors. Strateg. Manage. J. 10 (5), 399–411.

He, H., Li, Y., 2011. CSR and service brand: the mediating effect of brand identification and moderating effect of service quality. J. Bus. Ethics 100 (4), 673–688.

Heung, V.C., 2002. American theme restaurants: a study of consumer's perceptions of the important attributes in restaurant selection. Asia Pac. J. Tourism Res. 7 (1), 19–28.

Hummel, E., Murphy, K.S., 2011. Using service blueprinting to analyze restaurant service efficiency. Cornell Hospitality Q. 52 (3), 265–272.

Jemric, I., Vujcic, B., 2002. Efficiency of banks in Croatia: a DEA approach. Comp. Econ. Stud. 44 (2–3), 169–193.

Jeong, E., Jang, S.S., 2011. Restaurant experiences triggering positive electronic word-of-mouth (eWOM) motivations. Int. J. Hospitality Manage. 30 (2), 356–366.

Johns, N., Pine, R., 2002. Consumer behavior in the food service industry: a review. Int. J. Hospitality Manage. 21 (2), 119–134.

Kerkhoff, A.J., Enquist, B.J., 2009. Multiplicative by nature: why logarithmic transformation is necessary in allometry. J. Theor. Biol. 257 (3), 519–521.

Kim, W.G., Lim, H., Brymer, R.A., 2015. The effectiveness of managing social media on hotel performance. Int. J. Hospitality Manage. 44, 165–171.

Kim, W.G., Moon, Y.J., 2009. Customers' cognitive, emotional, and actionable response to the servicescape: a test of the moderating effect of the restaurant type. Int. J. Hospitality Manage. 28 (1), 144–156.

Kline, R.B., 2005. Principles and Practice of Structural Equation Modeling, second ed. The Guilford Press, New York, NY.

Kokkinou, A., Cranage, D.A., 2013. Using self-service technology to reduce customer waiting times. Int. J. Hospitality Manage. 33, 435–445.

Koo, L.C., Tao, F.K., Yeung, J.H., 1999. Preferential segmentation of restaurant attributes through conjoint analysis. Int. J. Contemp. Hospitality Manage. 11 (5), 242–253.

Kwok, L., Yu, B., 2013. Spreading social media messages on Facebook: an analysis of restaurant business-to-consumer communications. Cornell Hospitality Q. 54 (1), 84–94.

Lai, I.K., 2015. The roles of value, satisfaction, and commitment in the effect of service quality on customer loyalty in Hong Kong—style tea restaurants. Cornell Hospitality Q. 56 (1), 118–138.

Lee, S., Jin, N., Lee, H., 2014. The moderating role of water park service quality, environment, image, and food quality on perceived value and customer loyalty: a South Korean case study. J. Qual. Assur. Hospitality Tourism 15 (1), 19–43.

Li, J.J., Yang, Y., 2015. Describing and testing gender as moderator: illustrated substantively with a hypothesized relation between image, satisfaction, and behavioural intentions. Anatolia 26 (2), 258–268.

Liu, X.M., Li, J.J., Kim, W.G., 2015a. The role of travel experience in structural relationships of tourists' perceived image, satisfaction, and behavioural intentions. Tourism Hospitality Res., http://dx.doi.org/10.1177/1467358415610371.

Liu, X.M., Li, J.J., Yang, Y., 2015b. Travel arrangement as a moderator in image – satisfaction – behavior relations. An investigation of Chinese outbound travelers. J. Vacation Mark. 21 (3), 225–236.

Liu, Y., 2006. Word of mouth for movies: Its dynamics and impact on box office revenue. J. Mark. 70 (3), 74–89.

Liu, Y., Jang, S.S., 2009. Perceptions of Chinese restaurants in the US: what affects customer satisfaction and behavioral intentions? Int. J. Hospitality Manage. 28 (3), 338–348.

Mahajan, J., 1991. A data envelopment analytic model for assessing the relative efficiency of the selling function. Eur. J. Oper. Res. 53 (2), 189–205.

Marković, S., Raspor, S., Šegarić, K., 2010. Does restaurant performance meet customers' expectations? An assessment of restaurant service quality using a modified dineserv approach. Tourism Hospitality Manage. 16 (2), 181–195.

Michelle, R., 2015. How to Increase Operations & Materials Management in a Bar & Grill Club, Retrieved from ⟨http://smallbusiness.chron.com/increase-operations-materials-management- bar-grill-club-35954.html⟩.

Muller, C.C., 1999. A simple measure of restaurant efficiency. Cornell Hotel Restaurant Admin. Q. 40 (3), 31–37.

Namkung, Y., Jang, S., 2008. Are highly satisfied restaurant customers really different? A quality perception perspective. Int. J. Contemp. Hospitality Manage. 20 (2), 142–155.

NRA, 2014. 2015 Restaurant Industry Forecast, Retrieved from ⟨http://www.restaurant.org/News-Research/Research/Forecast-2015⟩.

Nunamaker, T.R., 1983. Measuring routine nursing service efficiency: a comparison of cost per patient day and data envelopment analysis models. Health Serv. Res. 18 (1), 183.

Pantelidis, I.S., 2010. Electronic meal experience: a content analysis of online restaurant comments. Cornell Hospitality Q. 51 (4), 483–491.

Park, C., 2004. Efficient or enjoyable? Consumer values of eating-out and fast food restaurant consumption in Korea. Int. J. Hospitality Manage. 23 (1), 87–94.

Park, S.Y., Allen, J.P., 2013. Responding to online reviews: problem solving and engagement in hotels. Cornell Hospitality Q. 54 (1), 64–73.

Parsa, H.G., Gregory, A., Self, J.T., Dutta, K., 2012. Consumer behavior in restaurants: assessing the importance of restaurant attributes in consumer patronage and willingness to pay. J. Serv. Res. 12 (2), 29–56.

Peiró-Signes, A., Segarra-Oña, M.D.V., Verma, R., Mondéjar-Jiménez, J., Vargas-Vargas, M., 2014. The impact of environmental certification on hotel guest ratings. Cornell Hospitality Q. 55 (1), 40–51.

Priya, D.M., Anthuvan, M.V.L., 2012. Impact of certification as moderator on export marketing strategy with reference to Tamil Nadu Leather Industry. Int. J. Res. Econ. Soc. Sci. 2 (3).

Reynolds, D., 1998. Productivity analysis in the on-site food-service segment. Cornell Hotel Restaurant Admin. Q. 39 (3), 22–31.
Reynolds, D., 2003. Hospitality-productivity assessment using data envelopment analysis. Cornell Hotel Restaurant Admin. Q. 44 (2), 130–137.
Reynolds, D., Thompson, G.M., 2007. Multiunit restaurant productivity assessment using three-phase data envelopment analysis. Int. J. Hospitality Manage. 26 (1), 20–32.
Saad Andaleeb, S., Conway, C., 2006. Customer satisfaction in the restaurant industry: an examination of the transaction-specific model. J. Serv. Mark. 20 (1), 3–11.
Sanjeev, G.M., 2007. Measuring efficiency of the hotel and restaurant sector: the case of India. Int. J. Contemp. Hospitality Manage. 19 (5), 378–387.
Sherman, H.D., Ladino, G., 1995. Managing bank productivity using data envelopment analysis (DEA). Interfaces 25 (2), 60–73.
Sparks, B.A., Browning, V., 2011. The impact of online reviews on hotel booking intentions and perception of trust. Tourism Manage. 32 (6), 1310–1323.
Sparks, B.A., Perkins, H.E., Buckley, R., 2013. Online travel reviews as persuasive communication: the effects of content type, source, and certification logos on consumer behavior. Tourism Manage. 39, 1–9.
Sulek, J.M., Hensley, R.L., 2004. The relative importance of food, atmosphere, and fairness of wait the case of a full-service restaurant. Cornell Hotel Restaurant Admin. Q. 45 (3), 235–247.
Susskind, A.M., Chan, E.K., 2000. How restaurant features affect check averages: a study of the Toronto restaurant market. Cornell Hotel Restaurant Admin. Q. 41 (6), 56–63.
Tracey, J.B., Hinkin, T.R., 2008. Contextual factors and cost profiles associated with employee turnover. Cornell Hospitality Q. 49 (1), 12–27.
Uri, N.D., 2001. The effect of incentive regulation on productive efficiency in telecommunications. J. Policy Model. 23 (8), 825–846.
Van der Lans, I.A., Van Ittersum, K., De Cicco, A., Loseby, M., 2001. The role of the region of origin and EU certificates of origin in consumer evaluation of food products. Eur. Rev. Agric. Econ. 28 (4), 451–477.
Weiss, R., Feinstein, A.H., Dalbor, M., 2005. Customer satisfaction of theme restaurant attributes and their influence on return intent. J. Foodserv. Bus. Res. 7 (1), 23–41.
Yang, Y., Liu, X., Li, J.J., 2015. How customer experience affects the customer-based brand equity for tourism destinations. J. Travel Tourism Mark., 997959, http://dx.doi.org/10.1080/10548408.2014.
Ye, Q., Law, R., Gu, B., 2009. The impact of online user reviews on hotel room sales. Int. J. Hospitality Manage. 28 (1), 180–182.
Yim, E.S., Lee, S., Kim, W.G., 2014. Determinants of a restaurant average meal price: an application of the hedonic pricing model. Int. J. Hospitality Manage. 39, 11–20.
Zakuan, N., Yusof, S.R.M., Saman, M.Z.M., Shaharoun, A.M., Laosirihongthong, T., 2012. The moderator effects of ISO/TS16949 certification in Thailand automotive industry. Procedia-Social Behav. Sci. 40, 141–145.
Zhang, J.J., Joglekar, N., Heineke, J., Verma, R., 2014. Eco-efficiency of service co-production connecting eco-certifications and resource efficiency in US Hotels. Cornell Hospitality Q. 55 (3), 252–264.
Zhang, Z., Ye, Q., Law, R., Li, Y., 2010. The impact of e-word-of-mouth on the online popularity of restaurants: a comparison of consumer reviews and editor reviews. Int. J. Hospitality Manage. 29 (4), 694–700.
Zhu, F., Zhang, X., 2010. Impact of online consumer reviews on sales: the moderating role of product and consumer characteristics. J. Mark. 74 (2), 133–148.
Zhu, X., Mukhopadhyay, S.K., Kurata, H., 2012. A review of RFID technology and its managerial applications in different industries. J. Eng. Technol. Manage. 29 (1), 152–167.