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Do independent hotels benefit from the presence of branded ones?

Yang Yang [a], Zhenxing (Eddie) Mao [b,*]

[a] School of Tourism and Hospitality Management, Temple University, Philadelphia, PA 19122, USA
[b] The Collins College of Hospitality Management, California State Polytechnic University, Pomona, Pomona, CA 91768, USA

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ABSTRACT

This paper investigates the performance changes of independent hotels due to the presence of nearby branded hotels in Texas. The moderating effects of these performance spillovers are also examined. Evidence from empirical analysis shows the existence and moderate significance of spillover effects from branded to independent hotels. Further analyses indicate that younger and higher-class independent hotels benefit significantly from performance spillovers from branded hotels. Higher-class branded hotels generate the vast majority of spillovers for their independent peers in the vicinity. Moreover, between the two types of branded hotels, franchised hotels generate the vast majority of spillovers, whereas contributions from chain-operated hotels are negligible. Suggestions are provided to independent hotels on how to improve their performance through spillovers from branded hotels.

1. Introduction

The hotel industry has been long characterized by a dichotomy of independent and branded hotels. Independent hotels typically lack sufficient resources due to a small ownership structure and no brand affiliation, which often engenders poor performance as suggested by the resource constraint theory (O'Neill & Carlback, 2011). Branded hotels, on the other hand, capitalize on valuable resources such as marketing, operational, and technological assistance from franchisors (Hayes, Ninemeier, & Nikker, 2017). Franchising is a business strategy and arrangement that allows one business entity to use the logo, trademarks, operating systems, standards, services, and resources of another business entity in a given location for a specified period of time in exchange for a fee (Blair & Lafontaine, 2005). Despite relatively high franchise royalty fees and the potential for highly restricted agency, many studies have showed that branded hotels are operated more efficiently than their independent counterparts (Ingram & Baum, 1997a). Hence, a significant performance gap has been recognized between independent and branded hotels.

In the economics and management literature, the term *spillovers* (or externalities) refers to the conditions under which firms can acquire information created by others without paying for that information in an economic transaction, while the creators of the information have no effective recourse under prevailing laws if other firms utilize the information (Grossman & Helpman, 1991). Performance spillovers derive from knowledge's incomplete excludability (Romer, 1990). To generate and diffuse these spillovers, there must be significant performance gaps between two involved parties. In other words, spillover-generating firms must possess some advantages over receiving firms. In addition, there must be channels for transferring the externalities that do not involve market transactions because these transfers are unintentional, involuntary, and indirect (Crespo & Fontoura, 2007; Sinani & Meyer, 2004). In the context of the lodging industry, independently-operated hotels may benefit more from the spillovers generated by branded properties (i.e., chain-operated and franchised hotels) that are better performed, more engaged in innovation activities and endowed with more resources (Orfila-Sintes, Crespí-Cladera, & Martínez-Ros, 2005), although independent and branded hotels learn from each other.

It is commonly assumed that branded hotels could make it difficult for their independent counterparts to remain competitive in a given market; however, the co-existence and equilibrium of both branded and independent hotels in local markets have proven otherwise. Many other factors, including spillovers of performance from the former to the latter, have not been fully considered. Spillovers enable independent hotels to improve performance by creating higher quality products and services, which can in turn lower the operating cost and generate more demand once consumers become aware of them (Canina, Enz, & Harrison, 2005).

Drawing on the strategic management literature, we empirically test the spillover effect and the moderating factors of this effect from branded to independent hotels that may explain the co-existence of these hotel properties in a competitive lodging market. We posit that branded hotels generate significant spillovers to independent hotels with

* Corresponding author.
E-mail addresses: yangy@temple.edu (Y. Yang), zmao@cpp.edu (Z.(E.) Mao).

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moderating factors and develop detailed arguments for these expectations in the following theory section.

We aim to make several contributions to the current understanding of hotel management and organization forms in the lodging market. First, from a theoretical point of view, this paper represents the very first research effort in which a conceptual framework explaining the mechanism of performance spillovers from branded to independent hotels is presented, along with a discussion of different channels triggering the spillovers through both demand- and supply-side aspects. We advance current knowledge theoretically by adding demand-side spillovers and consumer-induced innovation channel in the service-focused and customer-centered hospitality industry, which may greatly enrich the spillover literature and extend the scope of its channels. Second, using a panel data set we test and validate the spillover effect and its moderating factors in the lodging industry among different types of hotel operations. Lastly, based on the empirical results, we suggest ways in which independent hotels can improve their performance by taking advantage of spillovers from their branded neighbors. Our results may help independent hotels how to internalize these benefits under the nature of spillovers.

2. Literature review and hypothesis development

2.1. Spillovers from branded to independent hotels

Spillovers are essentially endogenous outcomes of the interactions between firms with superior performance/technology as generators and those with inferior performance/technology as receivers (Wang & Blomström, 1992). Within the context of the U.S. lodging industry, we regard branded hotels to be spillover generators and independent hotels to be spillover recipients with the premise that branded hotels are better performers due to brand equity or value, generally offering superior managerial practices and being more productive than their independent counterparts (Carvell, Canina, & Sturman, 2016; Ingram & Baum, 1997a; O'Neill & Carlback, 2011). This gap becomes one of the pre-conditions that the performance spillover occurs. The potential spillover effects from branded hotels to boost the performance of independent ones can be explained from both demand- and supply-side perspectives.

2.1.1. Demand-side spillovers

Branded hotels enjoy greater market visibility and awareness due to their advertising, promotion, and (inter)national geographical presence (Ivanova & Ivanov, 2015a). Through customer rewards programs, loyal guests are allured to the accumulated rewards and the widely applicable use of the rewards (O'Neill & Mattila, 2010). Apart from loyal guests stick to a hotel brand, other customers may also prefer branded hotels because of the quality signaling effect of the brand to reduce risks associated with stay in an unfamiliar property (O'Neill & Mattila, 2010). Therefore, well-established brands become valuable intangible assets to induce and retain a higher level of lodging demand (Enrique, José, & Jorge, 2007) and generate more sustained cash flows (O'Neill & Mattila, 2006).

Demand-side spillovers are manifest in service related industries such as restaurants and hotels when more customers are attracted to the area due to a reduction in consumer search costs (McCann & Folta, 2009). According to Chung and Kalnins (2001), branded hotels have traits and capabilities that can reduce consumer search costs and attract more demand to an area because they have well-recognized brand names and effective marketing/advertising efforts that could greatly penetrate to the potential market. In addition, independent hotels may receive another demand-related benefit called 'differentiation spillover' (Canina et al., 2005). This particular spillover arises when branded hotels invest to make the location more attractive, which will increase the demand of all hotels (including independent hotels) in the same area (Silva, 2016). Consequently, independent hotels are able to obtain the spillovers associated with the heightened regional lodging demand due to the presence of branded hotels. Also, because location is regarded as a paramount determinant of customers' hotel selection (Chu & Choi, 2000), neighboring hotels sharing similar location characteristics are highly substitutable. When there is a convention or mega event in town, branded hotels typically cannot meet all the demand surge. A number of convention/event attendees will flow over to nearby independent hotels for places to stay or for better value. At the same time, some leisure travelers have no choice but to stay at independent hotels. When the rooms are completely sold out, branded hotels will often walk potential guests to properties under the same management company or independent hotels in proximity that they think they will not lose business to in the future; rivalry branded properties would be the last and least favorable options to recommend. Therefore, independent hotels may gain their demand-side spillovers from customer overflow of nearby branded hotels, especially when rooms of branded hotels become unavailable during peak seasons.

2.1.2. Supply-side spillovers

A resource-based view suggests branded hotels in general, are endowed with more affluent financial, marketing, human resources, and accumulated management know-how and expertise (Ivanova & Ivanov, 2015b). They include national advertising, brand recognition and awareness, customer loyalty programs, operational support, operation standards, training procedures, system design, management consultation, and other resources that provide competitive advantages over independent hotels (Garcia-Falcon & Medina-Munoz, 1999). As a result, branded hotels are able to invest and develop newer innovations (Ottenbacher, Shaw, & Lockwood, 2006), establish better facilities and structures (Ivanova & Ivanov, 2015a), and adopt more intense technology (Siguaw, Enz, & Namasivayam, 2000) that independent hotels cannot afford, such as marketing efforts in search engines, centralized reservation systems, and revenue management department. In addition, branded hotels are more likely to achieve economies of scale with a lower per unit cost in operation and marketing through franchise (Ivanova & Ivanov, 2015a). They are able to negotiate a better deal with suppliers and partners to get lower prices due to higher volumes of purchase. The franchise can also offer a platform for developing innovation by facilitating mutual learning and allowing for innovation testing across affiliated branded hotels.

Branded hotels' advantage of resource and scale provides a nurturing environment to develop, transfer, and test different types of innovation. Then inter-firm organization structure within a hotel brand/chain facilitates the knowledge transfer and diffusion that enable affiliated firms access knowledge developed within the alliance, which are hardly available to independent hotels (Dahlstrom, Haugland, Nygaard, & Rokkan, 2009). This technology gap between branded and independent hotels largely triggers the supply-side spillovers. Better managerial practice and technological knowledge not only directly affects the performance of the firm that owns the knowledge (i.e., branded hotels), but may also produce spillover effects that may increase other firms' performance (i.e., independent hotels) (Arrow, 1962).

Foreign direct investment (FDI) literature has identified at least four major channels or mechanisms through which these supply-side spillovers may be present. They are demonstration/imitation, labor mobility, competition, and export (Blomström & Kokko, 1998; Crespo & Fontoura, 2007). While export is only applicable for FDI-related spillovers between foreign and indigenous firms, the rest are universally applicable and are briefly introduced below.

First, through demonstration/imitation, the recipient firm is able to reduce innovation costs simply by learning, imitating, and reproducing products and processes based on the advanced technologies and managerial practice demonstrated by the spillover-generating firms in the local market (Meyer & Sinani, 2009). The demonstration effects take place through interactions between spillover generators and recipients

at trade fairs, association meetings, research consortia and seminars (Dunning, 1993). In addition, independent hotels can learn from branded hotels through imitation via social learning such as observational learning, reverse engineering, social network technologies and local social gatherings (Virmani, 2015). Labor movement is the second channel through which independent hotels can acquire related technology and knowledge by employing key positions who previously worked for branded hotels. With limited resources, independent hotels have to prioritize its resources to hire experienced managers from their branded peers to improve their service quality and streamline their operation. Technologies in hospitality firms comprise soft skills such as service, organizational, management, operating and financial knowledge and practices, and they are much more embedded in human capital than in machinery and equipment (Grosse, 1996). Through labor movement, experienced hotel managers from branded hotels may make substantial contributions by increasing performance when hired by independent hotels in a labor-intensive and service oriented business. Labor movement could occur from branded hotels to independent hotels in two typical scenarios. For one, people would move from branded hotels to independent hotels to retain higher pay or better job opportunities. It typically takes longer time to become top management in a branded property in comparison to an independent hotel due to fiercer competition and career ceilings in a corporate world, all else being equal. For the other, branded hotels have a tradition to rotate managers to different locations to get well-rounded experiences, which would not be ideal for people who have strong ties with the area for various personal reasons such as kids schooling or spouse work. Consequently, these key hotel managers could move from branded to independent hotels to remain in a particular area. Furthermore, there witnesses a new move during the last decade in the hospitality industry that more and more hotels (both independent and branded properties) are managed by experienced managers under the third-party management companies (e.g., interstate and white lodging) which do not use the management company name as part of the brand name (Hayes et al., 2017). While many of the third party management companies operate branded hotels, they also operate independent hotels. As a result, collective knowledge, managerial expertise, and advanced technology are likely to be shared at an even faster rate among properties (independent and branded) under the same third-party management company, through either imitation or labor movement. The third channel is competition. Independent hotels, as spillover-receiving firms, are generally technologically inferior, may be motivated to adopt new technology and knowledge or reduce costs to remain competitive from increased competition due to the entry of new technology brought by spillover generators into the market. The competitive pressure may force the recipient firms to become more productive and efficient (Crespo & Fontoura, 2007), especially for firms in geographic proximity (Stanko & Olleros, 2013).

In the service sector, especially tourism and hospitality, a new possible spillover channel has been proposed through consumer (tourist) flows or movement (Marrocu & Paci, 2011), since close interaction between production and consumption leads to a higher orientation toward innovative activities to meet consumers' needs (Jacob & Groizard, 2007). Under the customer-active paradigm (Von Hippel, 1978), firms consider consumers to be one of the most important sources for innovative ideas that inform the creation and improvement of products and services (Foxall & Johnson, 1987; Zhou, Brown, & Dev, 2009). Consumers who have used innovative products and services provided by technology-rich firms will demand similar products and services by conveying these new ideas to technology-scarce firms. Technology-scarce firms can acquire new technology and knowledge from consumer demand to enhance efficiency and competitiveness. In such cases, technology-rich (i.e., branded hotels) and technology-scarce (independent hotels) firms become spillover generators and recipients, respectively. The exposure to consumers produces beneficial effects on the performance of spillover recipients (Marrocu & Paci, 2011).

In sum, Fig. 1 depicts the conceptual framework explaining the performance spillovers from branded hotels to their independent counterparts.

Technology and knowledge from branded hotels is transmitted to local independent hotels, which in turn boosts their performance by reducing costs, improving efficiency, introducing best practices, and stimulating competition. The forgoing arguments suggest the following hypothesis:

Hypothesis 1. There is a positive performance spillover effect from branded to independent hotels.

2.2. Moderators of spillovers

Spillovers occur; yet little is known about potential factors that may affect spillovers. These potential moderating factors are deemed necessary conditions for the realization of spillovers, and therefore should be endogenized in the research as a hypothesis. These factors may largely influence the absorptive capacity of the receiving firms, which is arguably the key determinant of spillover effects (Blomström & Kokko, 1998). Absorptive capacity is the ability of a firm to recognize the value of new external information, assimilate it and apply it commercially (Cohen & Levinthal, 1990). The firm's level of absorptive capacity depends upon its existing level of technological competence, its learning and investment efforts to be able to use advanced technology productively, and the technology gap between spillover generators and recipients (Ben Hamida, 2011; Narula & Driffield, 2012). In general, these factors pertain either to the characteristics of the recipient firms, the generating firms, or the market environments in which they interact (Ben Hamida, 2011; Szulanski, 2000). We investigate these related moderators.

A hotel property can be classified in several ways based on its attributes or traits, including size, age, and class. Essentially, these characteristics affect the technological capabilities of independently-operated hotels, thereby moderating potential spillovers. Hotel size is typically measured by a property's number of available rooms. Findings in the extant strategic management literature support the notion that large firms benefit more from advanced technology, and therefore are more likely to reap benefits associated with spillovers (Zhang, Li, Li, & Zhou, 2010). Hence, we hypothesize:

Hypothesis 2a. Larger size independent hotels can leverage more spillovers.

Age, another important attribute, measures how long a property has been operating. Hotels that have been operating longer possess better social capital, which in turn facilitates technology absorption. However, older hotels also are more likely to rely on dated technology and infrastructure because it is cost prohibitive for them to adopt the latest technology; thus, technology diffusion is likely tempered among older hotels (Bausch & Krist, 2007). Thus, the net effect of age on spillovers really depends on the relative strengths of a property's technological maturity and social network. As technological readiness is more applicable to spillovers, it is expected that the effect of technological maturity would outweigh any learning effects and social capital effects. Therefore, we make the following hypothesis:

Hypothesis 2b. Younger independent hotels can leverage more spillovers.

Hotel properties can be categorized based on their quality and service differentiation (Mazzeo, 2002). Hotels in different classes (i.e., from luxury to budget) focus on different market segments and have different quality standards. Higher end hotel properties charge higher room rates and are usually equipped with better technology capability. Not only do they have more financial and human capital to invest technological resources, but they also need to keep their technology current

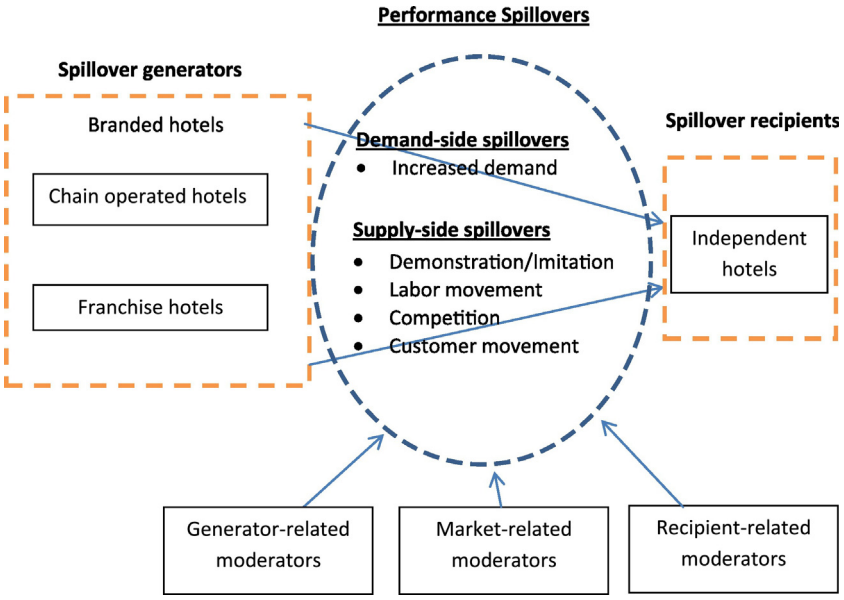

Fig. 1. Framework of performance spillovers from branded to independent hotel properties.

to meet high expectations and remain competitive. The absorptive capability of higher class independent hotels is therefore expected to be higher. Thus, we test the following hypothesis:

Hypothesis 2c. Higher class independent hotels can leverage more spillovers.

We explore the possibility that spillover effects are impacted by the local market in which spillover-generating and receiving properties interact. Of particular interest is the level of competition (i.e., hotel density within the same market) due to its direct impact on both spillover-generating and spillover-receiving firms. Although it is possible that competition may cut production for spillover-receiving firms, there is an even greater chance that these recipient firms are forced to use more advanced technology in order to survive and assure their market share. In addition, hotels tend to collocate to mainly enjoy agglomeration benefits (Chung & Kalnins, 2001). Therefore, spillovers can be expected to increase with competition in the local market. On the basis of this observation, we propose:

Hypothesis 3. Hotels in a market with more intense competition can leverage more spillovers.

Branded hotels can be further classified as chain-operated (brand-operated) vs. non-chain-operated (or franchised) properties according to the management method used. The former are operated by the brand management company, while the latter are operated by individuals or firms other than the brand management company. Anecdotal evidence on the relationship between operating methods of branded hotels (i.e., chain-operated vs. franchised) and property-level performance remain inconclusive (Kim, 2008; Kosova, Lafontaine, & Perrigot, 2013).

A key assumption in the spillovers literature is the indirect and involuntary nature of technology/knowledge transfer without a market transaction between two parties (i.e., branded and independent hotels) (Blomström & Kokko, 1998). The superior party (a branded hotel) may not realize an economic gain or even suffer an economic loss in the process. Therefore, branded hotels strive to prevent their superior technology from leaking to proximate independent hotels, which is primarily evident in chain-operated hotels, as their managers concentrate on building the value of both the property and the brand (chain) so as to protect the brand's superior technology. On the other hand, franchised hoteliers who focus only on building the property's value and exhibit no particular interest in the brand's technology are more likely to generate spillovers for nearby independent hotels. Moreover, the management teams of franchised hotels, especially those who have not signed management contracts, are likely to be more closely linked to the management teams of independent hotels in their local social networks, leading to a greater potential for transferring spillovers. Based on these arguments, we propose the following hypothesis:

Hypothesis 4a. Compared to chain-operated hotels, franchised branded hotels contribute to more spillovers.

Some attributes of spillover-generating firms directly relate to technological superiority in terms of technology intensity or magnitude (Sinani & Meyer, 2004). The technology gap hypothesis claims that spillovers can be optimized with right technological proximity between spillover generators and recipients. When the gap is too wide, recipient firms do not have the appropriate capacity to absorb the technology. When the gap is too narrow, recipient firms can only reap very limited benefits (if any) associated with the spillover effect. In a low-tech service industry such as lodging, most technology innovations are processes, ideas, and practices based on incremental advancements rather than disruptive or completely new innovations (Canina et al., 2005). Relative to lower-end brands, higher-end hotel chains typically exhibit relatively high technology intensity, which would best facilitate technology diffusion in the lodging industry since technology gaps among different hotel properties typically are not that wide (Hall & Williams, 2008). Hence, we propose:

Hypothesis 4b. Compared to economy and mid-class hotels, higher-class or luxury branded hotels contribute to more spillovers.

3. Data and model

To test the research hypotheses proposed in the previous section, we constructed a database of hotel properties in Texas with data on financial performance, hotel amenities and characteristics, and geo-spatial information. We merged data from two sources: (a) the Texas Comptroller of Public Accounts, which provides the taxable accommodation revenue, number of units, and tax obligation period for each hotel property; and (b) the STR Hotel Census Database, which includes ownership, operations, and amenity information about hotel properties. Based on the availability of hotel operation data from STR, we set the research

period as 2008–2014. Following the econometric specification recommended by Wooster and Diebel (2010), and Iršová and Havránek (2013), we regressed the performance of spillover recipients on the presence of spillover generators in a given area after controlling for a set of independent variables. Hence, we empirically assessed spillovers as the impact of the presence of branded hotels on individual hotels' performance. In this study, we specified generators as branded hotels (including both chain-operated and franchised hotel properties), and recipients as independent hotel properties. To help specify the empirical model, we assumed that this spillover effect occurred within a boundary of city, which is reported to the Texas Comptroller of Public Accounts. We specified the baseline empirical model as:

$$RevPAR_{it} = \alpha + \beta_1 \cdot percent\_branded_{it} + \beta_2 \cdot \ln percent\_branded_{it} \cdot \mathbf{Z}_{it} + \mathbf{Z}_{it}\delta + \mathbf{X}_{it}\gamma + \eta_t + \mu_i + \varepsilon_{it}$$

where i indicates an independent hotel property ($i = 1, \ldots, 1604$), and t indicates the year ($t = 2008, \ldots, 2014$). The dependent variable is $RevPAR_{it}$, which is defined as the total accommodation revenue per available rooms of independent hotel i in year t. This variable has been advocated in many studies as a measure of the performance of hotel properties (Anderson & Lawrence, 2014) because it takes both the average daily rate (ADR) and occupancy rate of a hotel property into account.

To model the performance spillovers from branded to independent properties, we introduced the key independent variable of interest, $percent\_branded_{it}$, which denotes the percentage of branded hotel rooms in the city where independent hotel i was located in year t. The percentage of branded hotel rooms is calculated as a ratio of the total number of rooms in branded hotels relative to the total number of rooms in all hotels. This variable measures the overall spillover effects from branded to independent hotels. Its coefficient, β_1, reflects the contribution of the presence of branded hotels to independent hotels' performance. A positive and significant estimated coefficient of β_1 would lend support to Hypothesis 1.

To test Hypotheses 2a–2c and 3, we introduced a set of moderators of spillovers in $\mathbf{Z}$, which include $rooms_{it}$, age_{it}, $class_{it}$, and $aggl_{it}$. More specifically, $rooms_{it}$ denotes the number of rooms offered by hotel i for accommodation in year t, indicating the size of a hotel; age_{it} measures the number of years after opening for hotel i in year t; and $aggl_{it}$ indicates the number of other hotel properties within a 5-mile radius of hotel i in year t. Moreover, we used a multinomial variable $class_{it}$ to indicate hotel class. The concept of class reflects how the property positions itself and the target market the property intends to serve. Within the STR database, we merged the "upper upscale" and "upscale" classes into a single "upscale" class, and the "upper midscale" and "midscale" classes into a single "midscale" class (STR Global, 2015). In the model, $class_{it} = 1$ for economy hotels, $class_{it} = 2$ for midscale hotels, $class_{it} = 3$ for upscale hotels, and $class_{it} = 4$ for luxury hotels. A positive and significant estimated coefficient of the interaction between *rooms* and *percent_branded* would lend support to Hypothesis 2a, whereas a negative and significant estimated coefficient of the interaction between *age* and *percent_branded* would lend support to Hypothesis 2b. Likewise, we introduced three interaction terms of class indicators with *percent_branded* (we set the interaction with $class = 1$ to 0 as the reference group). If Hypothesis 2c held, the estimated coefficient of interaction terms would follow a descending order from $class = 4$ to $class = 1$, and the interaction with high class levels would be positive and significant. Lastly, a positive and significant estimated coefficient of the interaction between *aggl* and *percent_branded* would lend support to Hypothesis 3.

To test Hypotheses 4a–4b, we measured the presences of different types of branded hotels. More specifically, to test Hypothesis 4a, we divided $percent\_branded_{it}$ into two parts: $percent\_chain\_op_{it}$ (ratio of chain-operated hotel rooms relative to all hotel rooms in the city where hotel i was located) and $percent\_franchise_{it}$ (ratio of franchised hotel rooms relative to all hotel rooms in the city where hotel i was located). If Hypothesis 4a held, the coefficient of $percent\_franchise_{it}$ would be significantly positive and larger than the coefficient of $percent\_chain\_op_{it}$. To test Hypothesis 4b, we divided $percent\_branded_{it}$ into four parts: $percent\_luxury\_brand_{it}$ (ratio of luxury brand hotel rooms relative to all hotel rooms in the city where hotel i was located), $percent\_upscale\_brand_{it}$ (ratio of upscale brand hotel rooms relative to all hotel rooms in the city where hotel i was located), $percent\_midscale\_brand_{it}$ (ratio of midscale brand hotel rooms relative to all hotel rooms in the city where hotel i was located), and $percent\_economy\_brand_{it}$ (ratio of economy brand hotel rooms relative to all hotel rooms in the city where hotel i was located). STR uses the following six categories of hotel brands (from high to low): luxury (e.g., Ritz Carlton), upper upscale (e.g., Westin), upscale (e.g., Doubletree), upper midscale (e.g., Holiday Inn), midscale (e.g., Howard Johnson), and economy (e.g., Days Inn) (STR Global, 2015). To keep the model parsimonious, we merged the upper upscale and upscale categories into a single "upscale brand" category, and the upper midscale and midscale categories into a single "midscale brand" category. If Hypothesis 4b held, the coefficient of $percent\_luxury\_brand_{it}$ would be significantly positive and larger than the coefficients of the other three variables, followed by the coefficient of $percent\_upscale\_brand_{it}$, with the coefficient of $percent\_economy\_brand_{it}$ being smallest.

The main effects of the $\mathbf{Z}$ variables are included in the empirical model with a vector of coefficient δ. As suggested by the past studies, the fierce competition associated with market saturation can lead to lower performance (Assaf & Cvelbar, 2011), and large-size hotel properties enjoy the benefits from the decreased cost per unit of output; this phenomenon is referred to as economies of scale (O'Donnell, Lee, & Roehl, 2012).We incorporated a set of control variables in $\mathbf{X}$ with a vector of coefficient γ. In particular, $mgt\_contract_{it}$ is a dummy variable indicating the existence of a management contract with a third-party management company: $mgt\_contract_{it} = 1$ if hotel i was managed by a third-party management company in year t, and $mgt\_contract_{it} = 0$ otherwise. Moreover, another dummy variable, new_owner_{it}, indicates a hotel ownership change in a particular year: $new\_owner_{it} = 1$ if hotel i experienced an ownership change in year t, and $new\_owner_{it} = 0$ otherwise. In the empirical model, η_t captures the year-specific effect for year t, and μ_i captures the time-invariant hotel-specific effect of hotel i that influences RevPAR but has not been incorporated into any explanatory variables. Therefore, the proposed two-way panel data model can remedy the potential problem of omitted-variable bias to some extent (Wooldridge, 2002). The error tem ε_{it} is assumed to follow a normal distribution with a mean of 0 and a definite variance.

Fig. 2 presents the map depicting the spatial pattern of hotel properties in Texas. In our data set, after deleting observations with incomplete information on some variables, we obtained a final sample of 1604 independent hotel properties and 3605 branded hotel properties (including 569 chain-operated hotels and 3036 franchised hotels). The map reveals three areas with high densities of both branded and independent hotels: the Greater Houston area (in the southeast), the Greater San Antonio area (in the middle) and the Dallas-Fort Worth area (in the north). The map did not reveal any substantial differences between the spatial patterns of branded and individual properties throughout the state. However, we did notice that moderately more independent hotel properties were located in some rural counties in northwestern Texas.

Table 1 presents the descriptive statistics of continuous variables in our sample of independent hotel properties in Texas. First, the average RevPAR of independent hotel properties was $28.25, which is lower than that of their branded counterparts, which was around $48.76. Moreover, the average percentage of branded hotel rooms in a city was 56.6%. Disaggregating this percentage into percentages of different branded hotel types, we found that chain-operated hotels accounted for 12.3% of total hotel rooms whereas franchised hotels accounted for the other 44.3%, suggesting that franchised hotels dominated the branded

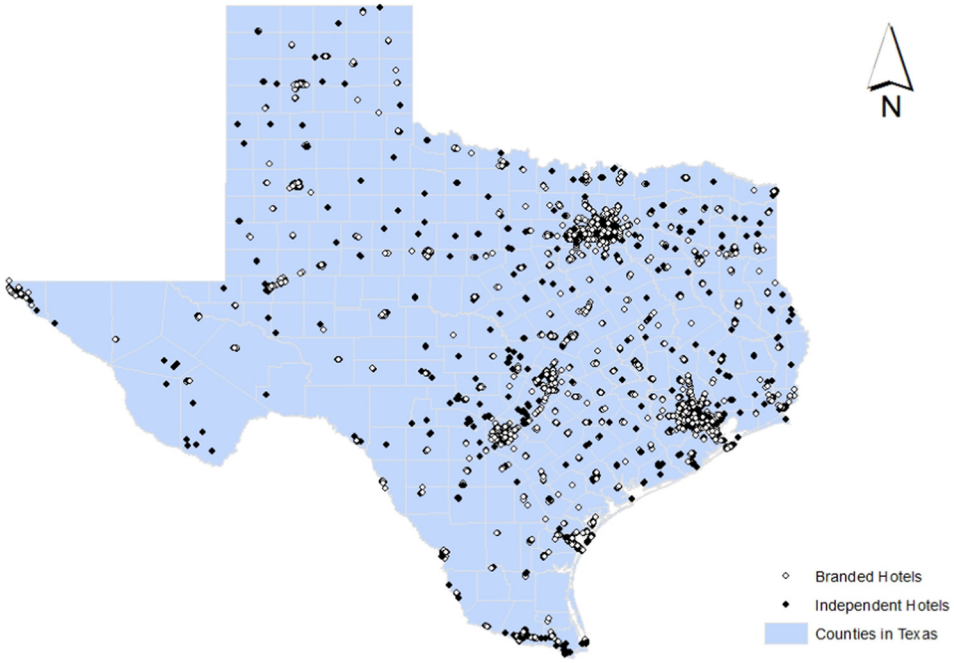

Fig. 2. Spatial distributions of branded and independent hotel properties in Texas in 2014.

hotel sample in Texas during our study period. The results show that 0.7% of hotel rooms were in luxury branded hotels, 13.1% were in upscale branded hotels, 26.2% were in midscale branded hotels, and 16.4% were in economy branded hotels. Furthermore, on average, the independent hotel properties in our sample had been operating for 30 years, had 26 other hotel properties within a 5-mile radius, and 64 hotel rooms.

Table 2 presents the descriptive statistics of categorical variables in the model. Due to the unbalanced nature of our panel data, there are a total of 7886 observations. As suggested by the table, economy hotels (*class* = 1) dominated independent hotel properties in Texas, comprising 74.42% of all Texas independent hotels. Only 1.81% of independent hotels were classified as luxury properties (*class* = 4). Moreover, only 4.1% of independent hotels were contractually managed by third-party hotel management companies. In our sample, ownership of 3.08% of properties changed during the study period.

4. Results

Significant statistics from the Hausman test suggest better suitability of the fixed-effect (FE) against the random-effect (RE) estimation for all models. Table 3 presents the estimation results based on the FE panel data estimation. Unlike its RE counterpart, the FE model allows interdependence between the independent variables and individual-specific effects. In Model 1, none of interaction terms are included, and *percent_branded* is estimated to be positive and moderately significant (at the 0.10 significance level). The coefficient is estimated to be 4.520, suggesting that a 10% increase in branded hotel room percentage in a city is associated with an average of $0.452 increase in RevPAR of independent hotel properties in that city. Therefore, Hypothesis 1 is supported at the 0.10 significance level. For other control variables, *mgt_contract* is estimated to be 7.406, which is statistically significant at the 0.05 significance level. This result suggests that independent hotel properties contractually managed by third-parties achieved a RevPAR that is $7.406 higher than other independent hotels. Moreover, *age*, *new_owner*, and *rooms* are estimated to be negative and statistically significant at the 0.01 level. The results show that an increase of 10 years in independent hotel's age is associated with a $0.304 loss in RevPAR, an independent hotel's ownership change contributes to a $6.207 loss in RevPAR for the year, and an increase of 10 rooms in independent hotels leads to a $2.71 loss in RevPAR. Our results corroborate O'Neill, Dev, and Hiromi's (2013) finding on the disadvantage of aged hotels, and Sainaghi's (2011) results on the diseconomies of scale in the lodging market. The measure of hotel agglomeration, *aggl*, is estimated to be insignificant. Lastly, in terms of an independent hotel's class, the results suggest that luxury hotels (*class* = 4) have the highest value of RevPAR, followed by upscale hotels (*class* = 3), which have RevPAR values that are significantly higher than economy hotels (*class* = 1, the reference group).

Table 1
Descriptive statistics of continuous variables in the empirical model.

Variable	Average	Std. Dev.	Percentile 25	Percentile 50	Percentile 75
RevPAR	28.247	32.431	11.955	19.209	32.793
percent_branded	0.566	0.297	0.387	0.654	0.827
percent_chain_op	0.123	0.153	0.000	0.052	0.246
percent_franchise	0.443	0.233	0.347	0.489	0.594
percent_luxury_brand	0.007	0.016	0.000	0.000	0.000
percent_upscale_brand	0.131	0.172	0.000	0.000	0.258
percent_midscale_brand	0.262	0.173	0.149	0.266	0.366
percent_economy_brand	0.164	0.124	0.073	0.174	0.230
age	30.249	20.815	14	27	42
aggl	26.160	26.852	4	18	39
rooms	63.826	57.240	31	45	72

Table 2
Descriptive statistics of categorical variables in the empirical model.

Categories	Frequency	Percentage
class = 1	5869	74.42%
class = 2	1352	17.14%
class = 3	522	6.62%
class = 4	143	1.81%
mgt_contract = 0	7563	95.90%
mgt_contract = 1	323	4.10%
new_owner = 0	7643	96.92%
new_owner = 1	243	3.08%
Total observations	7886	

Table 3
Estimation results from the fixed-effect panel data model.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
percent_branded	4.520*	3.655	11.473**	2.927	4.031		
	(2.503)	(3.425)	(5.197)	(2.431)	(2.853)		
percent_chain_op						−1.825	
						(5.122)	
percent_franchise						4.808*	
						(2.522)	
percent_luxury_brand							134.1**
							(61.122)
percent_upscale_brand							13.36*
							(7.179)
percent_midscale_brand							6.029*
							(3.242)
percent_economy_brand							0.535
							(2.668)
percent_branded∗rooms		0.0202					
		(0.055)					
percent_branded∗age			−0.231**				
			(0.115)				
percent_branded∗class = 2				−2.748			
				(3.260)			
percent_branded∗class = 3				17.43**			
				(7.886)			
percent_branded∗class = 4				86.83***			
				(21.311)			
percent_branded∗aggl					0.0883		
					(0.107)		
mgt_contract	7.406**	7.370**	7.434**	5.485	7.381**	7.383**	7.367**
	(3.217)	(3.201)	(3.231)	(3.353)	(3.203)	(3.215)	(3.145)
age	−0.0304***	−0.0304***	0.0471	−0.0309***	−0.0295***	−0.0327***	−0.0336***
	(0.005)	(0.005)	(0.039)	(0.005)	(0.005)	(0.005)	(0.005)
new_owner	−6.207***	−6.190***	−6.054***	−6.265***	−6.201***	−6.190***	−6.247***
	(1.382)	(1.373)	(1.380)	(1.348)	(1.381)	(1.379)	(1.379)
aggl	0.0466	0.0460	0.0538	0.0335	−0.0219	0.0372	0.0172
	(0.043)	(0.043)	(0.043)	(0.041)	(0.076)	(0.042)	(0.038)
class = 2	0.836	0.825	0.764	2.223	0.848	0.851	0.936
	(1.103)	(1.104)	(1.089)	(2.299)	(1.100)	(1.103)	(1.089)
class = 3	5.635*	5.569*	5.473*	−4.369	5.616*	5.638*	5.706*
	(3.027)	(2.996)	(3.042)	(5.378)	(3.016)	(3.026)	(2.987)
class = 4	18.51***	18.40***	18.28***	−28.67**	18.51***	18.51***	18.43***
	(6.793)	(6.839)	(6.817)	(13.939)	(6.780)	(6.783)	(6.728)
rooms	−0.271***	−0.283***	−0.273***	−0.289***	−0.270***	−0.270***	−0.264***
	(0.055)	(0.064)	(0.055)	(0.062)	(0.055)	(0.055)	(0.054)
constant	45.11***	45.61***	42.56***	47.66***	45.49***	46.08***	43.89***
	(3.870)	(4.081)	(4.218)	(4.301)	(3.955)	(3.967)	(3.798)
Observations	7886	7886	7886	7886	7886	7886	7886
Hotel units	1604	1604	1604	1604	1604	1604	1604
Hausman test	230.07***	355.95***	417.96***	636.96***	230.63***	454.11***	429.78***
R-sq	0.125	0.125	0.127	0.165	0.125	0.125	0.128
AIC	55,428.0	55,429.6	55,411.4	55,061.8	55,428.7	55,427.8	55,405.1
BIC	55,532.6	55,541.2	55,522.9	55,187.4	55,540.2	55,539.4	55,530.6

(Note: *** indicates significance at 0.01, ** indicates significance at 0.05, * indicates significance at 0.1. Robust standard errors are presented in parentheses. Estimates of year dummies are not presented for purposes of brevity.)

Models 2–4 incorporate interaction terms between *percent_branded* and moderating variables to test Hypotheses 2a–2c. To keep the model parsimonious, only one interaction term is considered in each model. In Model 2, the interaction term between *percent_branded* and *rooms* is positive, though not statistically significant, suggesting that larger-size independent hotels are not more capable of leveraging spillovers from branded hotels compared to smaller-size ones. Therefore, Hypothesis 2a is rejected. In Model 3, the interaction term between *percent_branded* and *age* is estimated to be negative and significant. This result lends support to Hypothesis 2b, and indicates that younger independent hotels are more capable of taking advantage of spillovers. The graph in Fig. 3 further visualizes the marginal effect of *percent_branded* with a 95% confidence interval among hotels of different ages. The graph shows that this effect, which can be interpreted as the magnitude of performance spillovers from branded hotels, decreases as independent hotels' age increases. For independent hotels less than 25 years old, performance spillovers are positive and significant at the 0.05 level. Hence Hypothesis 2b is accepted. In Model 4, we introduce three interaction terms between *percent_branded* and indicators of hotel class (*class* = 2, 3, and 4). The interaction terms with luxury- and upscale-class indicators are estimated to be positive and significant, and the spillover effect increases with hotel class level. We conducted a one-sided Wald test to determine whether the coefficient of *percent_branded∗class* = 4 is larger than *percent_branded∗class* = 3, and whether the coefficient of *percent_branded∗class* = 3 is larger than *percent_branded∗class* = 2. The results confirm Hypothesis 2c. Fig. 4 presents the marginal effect of *percent_branded* with a 95% confidence interval over independent hotels of four different classes. It shows that although this effect is statistically insignificant for economy and midscale independent hotels, it is significant and very pronounced for upscale and luxury properties. Lastly, in Model 5, the interaction term between *percent_branded* and *aggl* is added to test Hypothesis 3. This interaction term is found to be statistically insignificant. Therefore, Hypothesis 3 is rejected. The statistical significances and estimated coefficients for the other independent variables are quite similar to the results in Model 1, demonstrating the robustness of model specification.

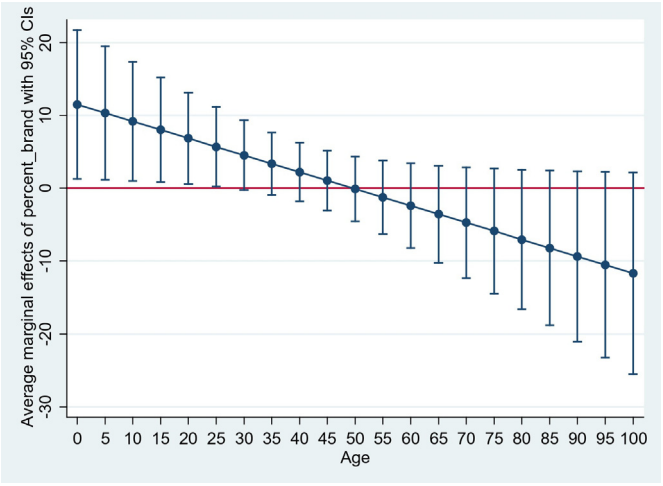

Fig. 3. Marginal effects of *percent_branded* with 95% CIs among independent hotels of different ages.

To further understand which types of branded hotels generate more performance spillovers, we break down *percent_branded* in Models 6 and 7. In Model 6, we use *percent_chain_op* and *percent_franchise* to replace *percent_branded*, and only *percent_franchise* is estimated to be statistically significant at the 0.10 level. Therefore, Hypothesis 4a is supported, and the result suggests that franchised hotels contribute largely to spillovers to independent hotels. In Model 7, we examine the impacts of branded hotels with different brand classes as spillover generators. Among the four independent variables measuring the percentages of the four brand classes, the estimated coefficient of *percent_luxury_brand* is much larger than the others, indicating the dominant role of luxury brand hotels as spillover generators. Also, the coefficients for *percent_upscale_brand* and *percent_midscale_brand* are estimated to be positive and moderately significant at the 0.10 level, showing the evidence that both upscale and midscale brand properties also partly contribute to these spillovers. However, based on the insignificant estimated coefficient of *percent_economy_brand*, we find that economy brand hotels barely generate spillovers. Together, these results support Hypothesis 4b.

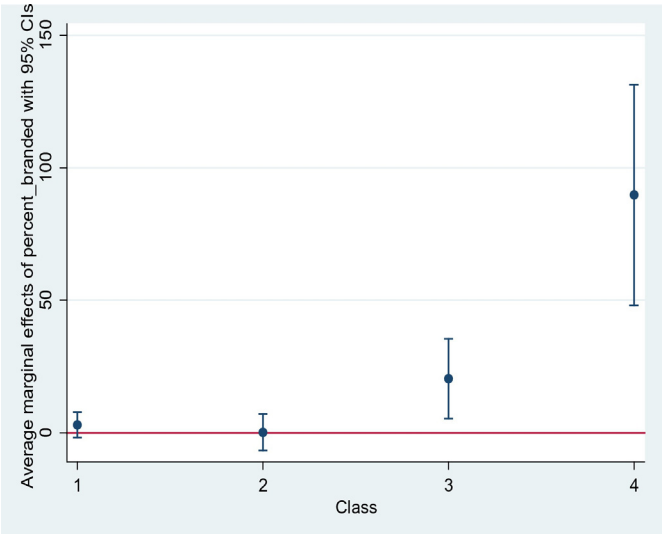

Fig. 4. Marginal effects of *percent_branded* with 95% CIs among independent hotels of different classes.

5. Discussion and conclusions

Using a sample of 1604 independent and 3605 branded hotel properties in Texas, we investigated the effect of branded hotel presence on the performance of independent hotels in the same local market from 2008 to 2014. This effect is referred to as performance spillovers. In addition, we examined the moderating effects of attributes of both branded hotels (i.e., class and management type) and independent hotels (i.e., size, age and class), as well as environment (i.e., competition) on the transfer of spillover benefits from branded to independent hotels. The econometric estimation results from the FE models suggested that for all independent hotels, the average spillover effect was moderately significant at the 0.10 significance level. Moreover, this spillover effect was more pronounced for younger and higher-class independent hotels. Furthermore, the results demonstrated that different types of branded hotels contributed differently to these spillovers. In particular, spillovers were predominately generated by franchised hotels, whereas spillovers generated by chain-operated hotels were negligible; moreover these spillovers can be largely attributed by high-class branded hotels.

As a mature and saturated business, the U.S. lodging industry is dominated by branded hotels (vs. independent hotels). Branded hotels in general enjoy superior performance over independent hotels due to technology advantages, brand awareness, well-established loyalty programs, and effective management expertise (O'Neill & Carlback, 2011). Our overall results show that independent hotels receive moderately internalized positive spillover benefits from their branded peers. Through both demand- and supply-side spillover mechanisms discussed in the literature review (i.e., increased demand, demonstration/imitation, labor movement, competition, and customer movement), independent hotels are able to enhance their performance indirectly due to the presence of branded hotels in vicinity. The findings thus provide direct evidence of co-existence among independent and branded hotels in Texas.

We also examined how independent hotels' attributes moderated their capacities to absorb these spillovers. Our results indicated that the age of independent hotels had an adverse effect on performance improvement. That is, younger independent hotels reaped more spillovers from branded hotels. Since they are more technologically ready (Bausch & Krist, 2007), younger hotels can observe and benchmark older hotels to determine key characteristics of their own properties (Ingram & Baum, 1997b), and in turn, receive more spillovers. Additionally, as expected, we found that higher-class independent hotels benefited more from spillovers from branded hotels. Compared to their lower-class counterparts, higher-class independent properties usually retain up-to-date equipment and talented employees, which enable them to better facilitate the absorption of technology spillovers to increase performance.

Contrary to our expectations, the size of independent hotels did not have a significant impact on their ability to absorb spillovers from branded hotels. This result seems intriguing and deserves further discussion. One possible explanation is that even though larger-size hotels can leverage more spillovers as argued in Hypothesis 2a, it could be relatively easier, more flexible and cost effective for smaller independent hotels to both make necessary operational changes and adopt newer technology to boost performance because they have low organization and management costs (Anastassopoulos, Filippaios, & Phillips, 2009). Therefore, both large- and small-size independent hotels have relative advantages and disadvantages in assimilating spillovers, rendering size an insignificant moderator. We also studied how local competition may affect performance spillovers between branded and independent hotels. Our results show no significant impact of competition on spillover effects. In other words, the degree of hotel density within an area neither helps nor impedes knowledge transfers between branded and independent hotels.

We further investigated the moderating effects of branded hotels' attributes on spillover effects. Our results revealed that higher-class branded hotels generated significant spillovers for nearby independent

hotels. Oftentimes, technology innovations in the lodging industry are limited and incremental; as a result, there may be inadequate technological distance to generate significant and meaningful performance impact. However, the technology gap between higher-class branded hotels and independent hotels is wide enough to facilitate performance spillovers. Thus, high-end branded hotels tend to generate the spillovers that actually help independent hotels grow and improve. In addition, our results show that only franchised hotels (as compared to chain-operated hotels) diffused significant spillovers to their independent neighbors. This result was expected, since the management teams in franchised hotels have no incentives to protect the brand's superior technology, enabling independent hotels to leverage significant spillovers. Hence, only franchised hotels generate significant performance spillovers to local independent hotels.

The findings of this study also offer practical insights for independent hotels to enhance performance through spillovers from branded hotels. On one hand, the positive relationships between being younger, being of higher class, and greater performance gains among independent hotels indicate that they must increase their absorptive capacity to better reap the spillovers from branded hotels. We recommend that independent hotels enhance their training programs for their employees, improve their service quality, and upgrade/innovate their technology facilities with a clear focus on product and service quality rather than quantity (size). Older independent properties may also enhance their ability to benefit from spillovers by refurbishing their facilities, mitigating disadvantages or taking advantage of new solutions (Sainaghi, 2011). On the other hand, as higher-class and franchised branded properties are more likely to generate performance spillovers, independent hotels are further advised to build close connections with them to receive more spillover benefits by seeking additional opportunities to socialize with hotel managers, recruiting more talented employees and imitating more operational practices from high-end franchised hotels, and asking for constructive feedback from guests who have previously stayed at such properties.

Some limitations must be acknowledged in our study. First, due to data unavailability, we were unable to access to other property-level financial information such as profits and non-accommodation revenue. Hotel performance measures incorporating other vital financial information can help present a more comprehensive picture of performance spillovers. In future studies, we advocate the collection of more nuanced property-level financial information to construct more comprehensive performance measures in the spillover regressions. Second, due to the quantitative empirical nature of this paper, we did not further investigate the framework presented in Fig. 1, which may require qualitative research endeavors. Therefore, we recommend that researchers perform qualitative studies to better understand how each channel facilitates or inhibits spillovers from branded to independent hotels. Third, our data set was limited to the state of Texas, which may limit the generalizability of our results. Future research is warranted across a national hotel sample to verify and validate our findings in the hotel industry in general.

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Yang Yang, Ph.D. (Assistant Professor, School of Tourism and Hospitality Management, Temple University) Email: yangy@temple.edu. His research interests include tourism economics and tourism geographies.

Zhenxing (Eddie) Mao, Ph.D. (Associate Professor, Chair of Hospitality Department, The Collins College of Hospitality Management, California State Polytechnic University, Pomona) Email: zmao@cpp.edu. His research interests include hospitality operation, strategic management and financial management.