

A Comparative Analysis of Innovation and Sustainable Growth Measurement in Hospitality Industry

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Abstract

The paper focuses on consideration of how to use nine performance factors to monitor innovation and sustainability in a relevant and useful manner in hotel and restaurant industry. Integrated information on sustainable development of a hotel or restaurant is very essential for decision-making since it is difficult to evaluate the performance of a company on the ground of too many success indicators. The objective of the work first was to design a model for obtaining composite sustainable development criteria for hotels and restaurants. Second, was to compare importance of defined sustainable growth and innovation measurement criteria for restaurants, chain and boutique hotels. Hence, study initially investigate terms of “innovation and sustainability” in the hospitality (service) industry concepts to present a conceptual framework and a comparative study. This was applied by determining the impact of individual factors to the overall sustainability of a company using the concept of F-TOPSIS method.

Keywords: Innovation and sustainability, hospitality industry, hotel and restaurant business, TOPSIS.

1. Introduction

Today, the major goal of companies is to make continue their competitive financial status and asset growth. Sustainability refers to being in relationship with the firm's compliance with its whole organic environment (Wilson et al., 2007). Sustainable growth can be obtained from increase in product or service quality and relationships with stakeholders, from government financial offers and from strong brand equity and firm reputation (Rodríguez-Antón et al., 2012). Various regulation instruments such as eco-labels, environmental procedures and certifications, environmental code of conducts (Ayuso, 2007) are applied for sustainable growth in the industry. Actually, there are many studies in the literature concerning sustainable growth and innovation. Innovativeness (Damanpour and Wischnesky, 2006) is considered to be among the most critical strategic approaches to achieve long-term profitability (Martinez-Sanchez et al., 2009). Successful innovation is customer-oriented (Ottenbacher 2007), and successful innovation can be achieved if the firm empower and support its “front-line” staff (Kayhan and Trueman, 2012) and through a strong link between strategic management and market positioning tools, organization scheme, technology and staff management (Sexton & Barrett, 2003). Furthermore, a strong link has been found between market orientation, innovation, and corporate performance (Han & Ryu, 2009). However, up to now just a few studies have analyzed the effect of innovation and sustainable growth in the hospitality industry. From the macroeconomic point of view, influencing factors in each facet of sustainability can be categorized as follows: social (“new rules and behaviors, community’s social involvement and safety”); organizational (“financial efficiency, relationships with stakeholders and supply chain partners”); environmental (“green marketing, social responsibility, environmental awareness”); economic (“procurement, restructure of economy, effectiveness and efficiency, staff recruitment and retention” (Wilson et al., 2007).

Planning at the external community level for a tourism enterprise enhance cooperation among all stakeholders taking place in tourism decision-making process (Fotis&Zardava, 2012). Hotel location does not play a significant role in perceptions of sustainable growth (Stylos and Vassiliadis, 2015). Internalization as a growth strategy, competing through seeking cost leadership and at the same time committing to a differentiation strategy are all found fundamental for sustainable growth in hospitality industry (Martinez-Lopez and Vargas-Sanchez, 2013). Generally, it is difficult to express the character and significance of criteria exactly or clearly through traditional methods. Therefore, we combine fuzzy sets theory (Zadeh 1965), and linguistic variables to establish a model that can guide decision makers to define and evaluate the sustainability and innovation criteria for hospitality industry through their importance level. The method allows making a comparative analysis among boutique, chain hotels and restaurants ranking nine major criteria of sustainability and innovation from the most to the least important one. Thus, a fuzzy-based decision model for ranking these criteria is more appropriate and effective than traditional methods. In addition, to stimulate a new alternative and the process of preference rating of alternatives becomes more clear and definite. The tourism industry and the hotel business operate both nationally and internationally. Chain hotels like InterContinental, Marriott, Hilton, and Sheraton have both international and national sales revenues; however, boutique hotels only operate on a national basis. For this reason, it can be claimed that there is a "power asymmetry" in the hotel industry, as local boutique hotels are limited in the resources to the extent they are able to implement innovative approaches and produce sustainable growth in competitive business. Restaurant managers need to focus on creating innovativeness in dining atmosphere to increase customers' positive approach, restaurant profit and customer loyalty to the dining space. Creativity and aesthetics in restaurant design also influence innovation (Horng et al., 2011). Restaurants' operational profit is affected by positive impressions of customers that end up with loyalty (Horng et al., 2011). Therefore, this study initially investigates the terms "innovation" and "sustainability" in restaurants, boutique and chain hotels to represent a conceptual framework. Turkish hotels and restaurants are positioning their growth strategies based on their competencies, then measuring and evaluating their relative performance within the scope of this framework. The uniqueness of the study comes from comparative importance analysis of the sustainability and innovation criteria defined for restaurants, chain and boutique hotels. Turkish hotels and restaurants are positioning their growth strategies based on their competencies, then measuring and evaluating their relative performance within the scope of this framework.

2.Literature review

The criteria of sustainability and innovation for hospitality industry are defined for analyze. Indeed, based on the literature below, nine major criteria are taken into consideration to measure sustainability and innovation in hospitality industry, which are budget management, sales techniques, eco-friendly entrepreneurship, brand management, new business models, supply of qualified employees, customer-specific service, new investment opportunities and overall service quality of the hotel. These nine factors are summarized with their definitions in Figure 1.

Figure 1. Decision model



2.1. Eco-friendly entrepreneurship

Environmentally-concerned service firms try to solve conflicts among all stakeholders while practicing green marketing and investments. Thus, one of the sub-dimensions of sustainable entrepreneurship appropriate for the tourism hotel industry is eco-friendly entrepreneurship ("firms that are sensitive to the environment") (Schaltegger et al., 2011). Tourism activities use huge amount of energy, water resources and materials, non-recyclable containers and packages, and other perishable products among others, that cause negative environmental effects (Robinot & Giannelloni, 2010; Myung et al., 2012). Environmental responsibility includes sustainability of renewable energy avoiding waste of water and electricity recycling, towel/linen reuse, optimum energy usage (like efficient use wind power or solar energy in order to produce a hotel's own electricity or hot water), pollution prevention, and conserving the ecological environment while making facility investments (Wilson et al., 2007, Mair & Bergin-Seers, 2010). Hotels consume electric energy for linen, laundry, water, food, and other kind of resources and also create pollution. They also consume space, use infrastructure facilities, and profit from relationships with government (Grosbois, 2012; Leonidou et al., 2013). Environmental courses and programs for employees that are focused on green marketing and management process should be supported (Chou et al., 2012). Boutique and chain hotels have different approaches from one another on the environmental management side. Chain hotels are more concerned about environmental protection and eco-friendly management style, also the conservation of the surroundings which increase attractiveness of the hotel as a tourism destination (Álvarez et al., 2001). However, boutique hotels concern more for staff management than for environmental management due to lack of standardization.

Environmental actions could show positive improvements in sustainable growth of hospitality business (Rodríguez-Antón et al., 2012). Environmental management has a major impact on revenue optimization and profit planning of a hotel. Other studies have focused on guests' attitude toward revisiting green hotels and accepting to pay premium rates (Kim & Han, 2010; Lee et al., 2010; Myung et al., 2012). Eco-friendliness has important effects on creativity, aesthetics, and performance. Environmental and lifestyle changes should have taken into consideration while designing restaurant spaces. "Green marketing has a cost for restaurant managers". Restaurant physical environment designers and owners should pay attention to environmental protection and use green landscape design using environmentally friendly materials (Choua et al., 2012; Horng et al., 2011). On the other hand, no correlation was found between hotel star ratings and environmental practices (Stylos and Vassiliadis 2015).

2.2. Develop New Business Models

New business models require knowledge management and value systems using new technology tools and being able to apply them to new business partnership implementations; coalitions of partners, hotel acquisitions or mergers (Hertog et al., 2010). New organizational systems with personnel, organization, culture, appropriate management and organization structure allow service providers to perform new work effectively and develop innovative services (Hertog et al., 2010), such as new guest-relation techniques or creation of new recipes for food and beverage departments. Using some new methods for customer interaction, beyond traditional methods to realize service attraction in a more efficient ways, creates mutual value for both the organization and the customer (Hertog et al., 2010). For example, hotel bookings made via OTAs (Open Travel Alliances) is totally more cost-effective and time saving removing intermediary commission paid to travel agencies. In the restaurant industry, some studies address the creativity of restaurant chefs and become the processes in creative chef development (Horng et al., 2011). Creativity in corporate culture and adoption measures to overcome barriers to innovation are found positively related to innovation (Martinez-Lopez and Vargas-Sanchez, 2013).

Franchising offers standardization for hotels that make easier to deal with many cultural, technical, legal, and employment procedures. Indeed, hotels lower the level of risk expending investment level (Alon et al., 2012). Hotel franchisors have the opportunity to share start-up costs, initial fees, and on-going royalties with the franchisees. In the hotel industry, organizational innovations and new model implementations can increase a firm's performance by reducing labour, supply, and logistics cost enhancing workplace satisfaction (Nicolau & Santa-Maria, 2013). Madanoglu et al. (2011), supported that publicly held restaurant firms perform better if they were franchised than if they were not. Activities such as research & development (R&D), technological capabilities (Ko & Lu (2010) are important in new business models. Good relationships and cooperation between intra-firm departments such as R&D and marketing provide sustainable growth.

For example the Accor Corporation has implemented a new knowledge management system in Germany where intranet system has been modified to obtain best service innovations and training possibilities (Ko& Lu, 2010). Hospitality companies co-operate with a bundle of service industries like convention, sightseeing or online travel agencies, tour operators, airport carriers to achieve a one qualified service product. One common and dominant characteristic of service providers is that all extensively use information and communication technology (Ko& Lu, 2010). Moreover, High rate of consolidations in the hospitality industry minimize the efforts for individual learning in organizations (Hallin & Marnburg 2008). The most logical option during consolidations is to apply international management systems (IMS), adopt a large number of standards simplifying auditing procedures and reducing costs during mergers and acquisitions (Rodríguez-Antón et al., 2012).

2.3. Customer-Specific Service

Entrepreneurial firms should behave in an innovative way to become market leaders. Perceived future customer needs should be matched with proactive and innovative decisions of the hotel. Hospitality business can increase its innovativeness and profitability while being more customer-oriented. (Kayhan et al.,2012). Stylos and Vassiliadis (2015) proved that hotel star ratings and customer-specific services based on star ratings has a critical role in the perceived importance of financial measures of economic viability. Innovative employees and managers support hotel and restaurant business success. Menu item planning , menu item innovation and variety in order to generate a menu content of an optimum composition of food and beverage offerings is the most preferred way of customization in restaurants. Hospitality business managers need to frequently update their customer portfolio meet changing customer needs (Ottenbacher, 2007; Orfila & Mattsson, 2009). It is found that customers showed more willingness to stay in Swiss hotels that follow a more innovative approach (Kayhan et al., 2012). Customization capabilities, market-related activities, understanding customer needs, meeting them and reaching out to the customer in the appropriate way are among priority items of innovation (Ko& Lu, 2010). For example, different reservation and special gift services for “exclusive customers” might be a good example of customization. The new tourism of today produces tailor-made customized services and flexible holiday packages to more experienced and educated individuals with different expectations, income levels, time limits, and travel choices (Fotis&Zardava, 2012). Indeed, alternative tourism is another way of customization to satisfy guests’ expectations.

2.4. Brand Management

Branded hotels provide service standardization and allow the hotel business to better understand their guests upgraded and unique service requirements. Boutique hotels offer booking and reward platforms for independent and group reservations grouped by type rather than by brand (Jayawardena et al. 2013). The same approach is also true for the chain hotel industry, operating a brand-name chain hotel requires not only a short orientation process about the hotel structure, but also understanding the whole operational model, customized regulations and policies, and hotel trademark. Hotel’s brand name and reputation are key assets for a hotel (O’Neill & Mattila, 2010). A brand hotel can much more easily use a corporate loyalty programs, frequency and membership cards, discount rates, bundling and packaging that help to attract guests and keep the brand name on mind. Members of the loyalty programs receive all updated information about the new benefit options through regular mailings (Jayawardena et al., 2013). Indeed, the loyalty customer program is a strong marketing tool to bargain and keep the customer loyal. Customers with high brand awareness and loyalty do not spend time to find the right hotel for them-selves. Horng et al. (2011) assumed that restaurants should offer new consumption experiences to keep customers on hand. The new trend in the food and beverage sector, especially in high-end boutique hotels, is the availability of local beverages in guestroom bars, especially like wines, spirits, and after-dinner beverages. The brand image of a restaurant can be obtained by innovation in design, atmosphere, and overall creativity in the physical dining area. Moreover, lifestyle of people is changing and dining outdoors became important for socializing; customers want to try new tastes and also a unique dining environment experience (Liu & Jang, 2009). Therefore, the intangible assets of restaurants gain importance in brand recognition (Heung & Gu, 2012; Ryu& Han, 2010).

2.5. Supply of Qualified Employees

The hotel industry offers education and rewards programs in order to obtain high-skilled front-office clerks, concierge, sales agents, and food and beverage managers, etc.

Jobs in the hospitality industry are generally perceived as seasonal, part-time, low-paid despite long working hours, which may end up with not only unqualified labour profile but also decrease in demand for recruitment (Jayawardena et al., 2013). Training support, fair wages, benefits and career opportunities should be provided (Kara et al., 2012). In the restaurant business, effectiveness and efficiency could be obtained with a team work that follow-up the transfer of a product or service to the customer from the beginning till the ending stage (Gawande, 2012). From the economic view of sustainability, Zheng et al. (2011) mentioned the importance of labour productivity in sustainable growth in China where the service industry start to lose its labour force after the wages in manufacturing industry increased with the inflow of workers into manufacturing industry from the non-agricultural side. Turkey, has the same problem, since the labour force in the service industry moves to other industries with higher wage rates, and the quality of service personnel, especially in hospitality industry, decreases because of the unsatisfactory wages and on-the-job training. In the hospitality industry, properly trained staff could enhance the sense of environmental awareness and responsibility of tourists which will bring sustainability and growth in the long-term. For this reason, investments in a qualified work force are necessary (Fotis & Zardava, 2012).

2.6. Budget Management

New revenue management models in hotels that distribute costs and revenues appropriately across departments like food & beverage, housekeeping, sales, accounting, banquet, and technical support are important for budget management (Hertog et al., 2010). In hotel budget management, business strategies allow ability to make price competition, obtain accurate market information and accurate pro-forma room-sales revenue forecast. Organizational innovation is not only developing a new business model or operating in a new market, but also adding novelties to the current operational business (Ko & Lu, 2010; Schaltegger et al., 2011). Budget planning also involves the ability to obtain outsources for the needed service or product continuously using the distribution of resources in the most efficient way to assure sustainability (Ko & Lu, 2010). Benchmarking in the restaurant industry may have an important role in budget planning. A benchmark firm is defined “as a firm whose stock price increases with time” (Hua & Lee, 2014). Benchmarking is important in rent payment, inventory and cash-flow management, perishable and non-perishable items control in a restaurant. Firms use the benchmarking approach to transform its managerial capabilities into a more sophisticated and systematic on-going process to achieve sustainability in financial performance. Indeed, new changes in firm’s approaches and methods can enhance innovativeness and differentiation (Hua & Lee 2014). Moreover, in the restaurant business, accurate sales forecast of menu items is important due to the perishable nature of food products and the need to minimize potential spoilage and waste. Vaughn et al. (2010) suggested the use of an activity-based costing method in restaurants instead of a unidimensional cost control system in order to accurately determine the cost of menu items.

2.7. Sales techniques

Sales techniques are defined as “increasing the firm’s sales such as detecting new segments, redesigning promotional messages or introducing new alternative pricing methods”. (Nicolau & Santa-Maria, 2013). The organizational view of sustainability mostly focuses on innovation. The growth of the firms depends on the penetration of new product and services in the market. Growth strategies are based on a bundle of new product, service and market preferences, where the growth rate is related to the change in sales in recent years (Kalevi et al., 2011). In restaurants, menu item pricing is important to achieve optimum profit and sales based on perceptions and expectations of customers. Depending on the price sensitivity or price elasticity, customer demand for food and beverage offerings of a particular restaurant may change in response to fluctuations in item prices. Psychological pricing methods are important in the sales setting (Raab et al., 2009). Moreover, menu design has an important role in sales setting. Menu design relates to a variety of factors including background and text colours, texture, photos, fonts, the use of boxes. Menu size, one of the characteristics of menu cards, also has considerable effects on customers' item choices. Innovativeness, such as evocative labels on menu card (Wansink et al. 2005), details in items' descriptions (McCall & Lynn, 2008), nutritional information on the menu card and perceived taste of items (Hwang & Lorenzon, 2008) have considerable effects on customers' item choice and sale of items. Changing menu content is also an important component of menu innovation to see how new menu items will influence sales and profit.

2.8. Overall service quality

The perceived value of the service for a customer is a solution to satisfy a need that has not been met or remarked before. Examples include new service delivery systems like e-tourism with advanced marketing and multi-channel management, customization, self-service concept and so on. Multi-channel management comes with outsourcing of new employees, food delivery, or transportation service for customers like airport transportation (Hertog et al., 2010). Power distance and customer orientation are critical factors since front-line clerks and supervisors have to continually share information to create novel strategies (Kayhan et al., 2012). Besides, knowledge management is especially relevant for hotel chains to sustain consistency in quality standards for each chain hotel. The intellectual capital of the organization could also increase their competitive advantage (Hallin&Marnburg, 2008). The restaurant quality management system should assure food quality, hygiene and safety, relying on standard production, minimum service failures, optimum demand, and suitable cost structures. Inevitably, service failures may occur at any stage of service which are first greeting, then order taking and delivery, and lastly payment and exiting (Namkung et al., 2011). These failures may lead to negative customer perceptions and complaints (Namkung et al., 2011). Besides, the overall restaurant quality also includes the service quality at the table, the quality of restaurant managers, restaurant staff, and the atmosphere of the facility. Thus, a restaurant's strategy to create entertaining, comfortable, aesthetic and eco-friendly environment spaces may be an important sales strategy (Horng et al., 2011).

2.9. New investment opportunities

New investment opportunities depend on external resource management capabilities to use outsourcing sources and incentives from the government for new hospitality business investments. (Ko& Lu, 2010). The degree of active government commitment in investments and giving incentives empower innovation (Martinez-Lopez and Vargas-Sanchez, 2013). New industrial investments can be made through mergers and acquisitions, reducing overall management cost, creating synergies, and simplifying audits for **hotels** and corporations. In this way, corporations can derive mutual benefit from their strengths and from customer satisfaction return. Other investments can be made in technology-related activities, in R&D areas (Ko & Lu, 2010). Moreover, government incentives can be used for new investments in government recreation lands or for both national and international private hospitality consolidations (Rodríguez-Antón et al., 2012). The government could empower voluntary entrepreneurial activities, new green investments, innovative policies and strategies at restaurant industry to obtain a better, green environment (Choua et al. 2012). "Green marketing" awareness among both customers and investors should be supported by government and other relevant institutions. The more appealing motivators of the government beside consultation from governments and governmental institutes would be government subsidies, public awards, incentives, and taxation reductions to restaurants. Moreover, contracts with government for free or discounted public advertisements like billboards rented for special prices could be offered to increase restaurants' performance (Chou et al., 2012).

3. Research design and methodology

The fuzzy set theory introduced by Zadeh (1965) is suitable for handling problems at the absence of sharply defined criteria. In a universal set of discourse X , a fuzzy subset A of X is defined by a membership function $f_A(X)$ which maps each element X in A to real number in the interval $(0,1)$. The function value $f_A(X)$ represents the grade of membership of x in A . The larger the $f_A(X)$, represents the grade of membership of x in A . The larger the $f(A)X$, the stronger is the grade of membership for x in A . Fuzzy technique for preference by similarity to ideal solution (F-TOPSIS) was preferred to obtain the collective preference scoring and ordering criteria. F-TOPSIS could be used for a multi-attribute decision-making problem with t alternatives as a geometric system with t points in the n -dimensional space (Kahraman et. al, 2007). The implementation of F-TOPSIS that is used in this study is adopted from Hwang and Yoon (1981). The convenience of applying F-TOPSIS methodology listed such as (a) logically intuitive, (b) simple and comprehensible, (c) compute efficiency, (d) measurable relative performance with respect to e) ease of mathematical descriptions, and (e) applicable in decision problems (Deng et al., 2000; Yeh et al., 2000, Chen et al., 2011). Yang and Hung (2007) describe this methodology as:

Step 1: Determine the weighting of evaluation criteria; the overall weights of various criteria have been considered.

Step 2: Choose the appropriate linguistic variables for the alternatives with respect to criteria. The linguistic variables are described by TFNs, such as $\tilde{x}_{ij} = (a_{ij}, b_{ij}, c_{ij})$ in Table 1.

Table 1. Linguistic Variables for the Preference Rating of Alternatives

| Linguistic variable | Corresponding triangular fuzzy numbers |
|---------------------|--|
| Very poor (VP) | (0.0, 0.0, 0.2) |
| Poor (P) | (0.0, 0.2, 0.4) |
| Fair (F) | (0.3, 0.5, 0.7) |
| Good (G) | (0.6, 0.8, 1.0) |
| Very Good (VG) | (0.8, 1.0, 1.0) |

The fuzzy calculations done in a fuzzy decision matrix as follows;

$$D^k = \begin{matrix} & C_1 & C_2 & \dots & C_n \\ \begin{matrix} A_1 \\ A_2 \\ \dots \\ A_m \end{matrix} & \begin{bmatrix} x_{11}^k & x_{12}^k & L & x_{1n}^k \\ x_{21}^k & x_{22}^k & L & x_{2n}^k \\ \dots & \dots & \dots & \dots \\ x_{m1}^k & x_{m2}^k & L & x_{mn}^k \end{bmatrix} \end{matrix}, i = 1, 2, \dots, m; j = 1, 2, \dots, n \tag{1}$$

$$x_{ij}^k = \frac{1}{k} (x_{ij}^1 + x_{ij}^2 + \dots + x_{ij}^k) \tag{2}$$

where \tilde{x}_{ij}^k is the rating of alternative A_i with respect to criteria C_j evaluated by decision makers, and $\tilde{x}_{ij}^k = (a_{ij}^k, b_{ij}^k, c_{ij}^k)$.

Step 3: Construct the fuzzy decision matrix and the normalized fuzzy decision matrix avoid the complicated normalization formula used here to transform the various criteria scales into a comparable scale. Therefore, we can obtain the normalized fuzzy decision matrix denoted by \tilde{R} :

$$R^k = [r_{ij}^k]_{m \times n} \quad i = 1, 2, \dots, m; j = 1, 2, \dots, n. \tag{3}$$

Then the normalization process can be performed by following formula:

$$\text{where } r_{ij}^k = \left(\frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*} \right), \tag{4}$$

$$c_j^* = \max_i c_{ij}. \tag{5}$$

The normalized \tilde{r}_{ij}^k are still triangular fuzzy numbers.

Step 4: Construct the weighted normalized fuzzy decision matrix.

Normalized triangular fuzzy numbers range between $[0,1]$ is mentioned to preserve the property in the normalization method. For each criterion importance, weighted normalized fuzzy decision matrix can be constructed

$$\tilde{V} = [\tilde{v}_{ij}^k]_{m \times n}, i = 1, 2, \dots, m; j = 1, 2, \dots, n. \tag{6}$$

and

$$\vartheta_{ij}^k = r_{ij}^k \times w_j \tag{7}$$

Step 5: Determine the fuzzy positive-ideal solution (FPIS) and fuzzy negative-ideal solution (FNIS).

According to the weighted normalized fuzzy decision matrix, we know that the elements \tilde{v}_{ij}^k are normalized positive TFNs and their ranges belong to the closed interval $[0,1]$. Then, we can define the FPIS A^* and A^- as following formula:

$$A^* = (\vartheta_1^*, \vartheta_2^*, \dots, \vartheta_n^*) \tag{8}$$

and

$$A^- = (\vartheta_1^-, \vartheta_2^-, \dots, \vartheta_n^-) \quad (9)$$

$$\text{where } \tilde{v}_j^+ = w_j \times (1,1,1) \text{ and } \tilde{v}_j^- = w_j \times (0,0,0) \text{ for all } j = 1, 2, \dots, n. \quad (10)$$

Step 6: Calculate the distance of each alternative from FPIS and FNIS.

The distances (d_i^* and d_i^-) of each alternative from A^* and A^- can be currently calculated by the vertex method (Chen, 2011), which is calculated as:

Let $\tilde{a} = (a_1, a_2, a_3)$ and $\tilde{b} = (b_1, b_2, b_3)$ be two triangular fuzzy numbers,

$$d(\tilde{a}, \tilde{b}) = \sqrt{\frac{1}{3} \left[(a_1 - b_1)^2 + (a_2 - b_2)^2 + (a_3 - b_3)^2 \right]} \quad (11)$$

then,

$$d_i^* = \sum_{j=1}^n d(\vartheta_{ij}, \vartheta_{ij}^*), i = 1, 2, \dots, m \quad (12)$$

and

$$d_i^- = \sum_{j=1}^n d(\vartheta_{ij}, \vartheta_{ij}^-), i = 1, 2, \dots, m \quad (13)$$

where $d(\cdot, \cdot)$ is the distance measurement between two fuzzy numbers.

Step 7: Calculate the closeness coefficient (CC).

A CC is defined to determine the ranking order of all criteria once the d_i^* and d_i^- . The CC of each criterion is calculated as

$$CC = \frac{d_i^-}{d_i^* + d_i^-}, i = 1, 2, \dots, m. \quad (14)$$

Step 8: According to the CC, the ranking order of criteria can be determined.

We can determine the ranking order of all criteria and select the best one.

4. Application and Results

Survey and Data Collection

The survey was conducted from 143 boutique and chain hotel and 59 restaurants in Istanbul and Ankara, Turkey with 119 hotel executive officers and 47 restaurant managers who were invited to fill out the questionnaire. It is aimed to identify the most important factors that affect innovation and sustainability in hotel and restaurant business. To analyze environmental and economic responsibility issues, it is preferred to use a hierarchical approach with group decisions.

Measurement Instruments

Nine major criteria previously defined to measure sustainability and innovations in hospitality industry are subjected to analysis. These nine criteria, which were budget management, sales techniques, eco-friendly entrepreneurship, brand management, new business models, supply of qualified employees, customer-specific service, new investment opportunities and overall service quality of the hotel are subjected to analysis are ranked among each other from the most to the less important ones. The ranking process is accomplished separately for chain hotels, boutique hotels, and restaurants. A survey contains all innovation and sustainable growth criteria for level of the model was arranged and performed to gather the pair wise comparison experience from all evaluation team members. The model could be implemented also in other parts of tourism industry including other tourism suppliers and retailers. The application is very useful when collecting data. In a one level hierarchy of attributes are respected to the judgments of the pair wise comparison and also contains all attributes of higher and starting levels of strategic factors. The results show that each service industry has a different order of criteria because of their inherent characteristics. Chain hotel managers should focus on, firstly, overall service quality secondly, brand management; and, third sales techniques.

However, the order and importance of criteria for boutique hotels are different: supply of qualified worker comes first; secondly, overall service quality; and thirdly new investment opportunities. For restaurant industry, sales techniques are ranked at first, then eco-friendly entrepreneurship, and brand management follow it in sequence. Based on our research, the weakest aspect of the hotel industry is that less importance is given to budget management; and for the restaurant industry, the weakest criteria is new investment opportunities. A comparison can be done by CC values. Tables show descending order of each criterion according to their importance value (see in Table 2 and Table 3). As a result, we would get a conclusion that the order helps decision maker to understand the importance of role criterion while understanding the behavior of evaluator. The result depends on the surveyed average ratings so it would be different for another evaluator group.

Table 2. Distances of Alternatives to Positive / Negative Ideal Solutions, Related Closeness Coefficients

| Criteria | Chain Hotels | | | Boutique Hotels | | | Restaurants | | |
|----------|--------------|---------|----------|-----------------|---------|----------|-------------|---------|----------|
| | d_i^* | d_i^- | CC | d_i^* | d_i^- | CC | d_i^* | d_i^- | CC |
| BuM | 0.8101 | 0.2252 | 0.217521 | 0.81301 | 0.2452 | 0.231712 | 0.7901 | 0.2752 | 0.258331 |
| ST | 0.7995 | 0.3002 | 0.272984 | 0.7489 | 0.2421 | 0.244299 | 0.7338 | 0.3003 | 0.290397 |
| EE | 0.8041 | 0.2648 | 0.247731 | 0.8041 | 0.2748 | 0.254704 | 0,7429 | 0.2777 | 0.272095 |
| BrM | 0.7884 | 0.3012 | 0.276432 | 0.7624 | 0.2701 | 0.261598 | 0,7654 | 0.2746 | 0.264038 |
| NBM | 0.7621 | 0.2468 | 0.244623 | 0.7621 | 0.2578 | 0.25277 | 0,7683 | 0.2444 | 0.241335 |
| QE | 0.7589 | 0.2421 | 0.241858 | 0.7148 | 0.2988 | 0.294791 | 0,8143 | 0.2849 | 0.259189 |
| CSS | 0.8008 | 0.2898 | 0.265725 | 0.8118 | 0.2808 | 0.257002 | 0,8128 | 0.2688 | 0.248521 |
| IO | 0.7424 | 0.2667 | 0.264295 | 0.7844 | 0.2999 | 0.276584 | 0,8001 | 0.2139 | 0.210947 |
| SQ | 0.7156 | 0.2934 | 0.290783 | 0.7995 | 0.3112 | 0.280184 | 0,7985 | 0.2568 | 0.243343 |

Based on the CC values, the ranking of the alternatives in descending order is given in Table 3.

Table 3. Ranking of Criteria

| Rank | Chain Hotel | | Boutique Hotel | | Restaurants | |
|------|-------------|--------|----------------|--------|-------------|--------|
| | Criteria | CC | Criteria | CC | Criteria | CC |
| 1 | SQ | 0.2934 | QE | 0.2947 | ST | 0.2903 |
| 2 | BrM | 0.2764 | SQ | 0.2801 | EE | 0.2720 |
| 3 | ST | 0.2729 | IO | 0.2765 | BrM | 0.2640 |
| 4 | CSS | 0.2657 | BrM | 0.2615 | QE | 0.2591 |
| 5 | IO | 0.2642 | CSS | 0.2570 | BuM | 0.2583 |
| 6 | EE | 0.2477 | EE | 0.2547 | CSS | 0.2485 |
| 7 | NBM | 0.2446 | NBM | 0.2527 | SQ | 0.2433 |
| 8 | QE | 0.2418 | ST | 0.2442 | NBM | 0.2413 |
| 9 | BuM | 0.2175 | BuM | 0.2317 | IO | 0.2109 |

5. Conclusion

Based on the statistical results, this article has established the relative importance of innovation and sustainable growth measurement in the hotel and restaurant business discussed below for boutique hotels, chain hotels and restaurants. The methodology allowed taking into account the preferences, the personal judgment, and experience of the various factors involved in the study.

Boutique hotel

“Supply of qualified employee” criterion ranked in first place since unqualified or low qualified employees can easily create negative customer evaluation and destructive word-of-mouth. Unstandardized and limited number of worker population will have bigger positive or negative effect on consumers. On the other hand, in a chain hotel, some unqualified employees among the entire large population of employees cannot create a significant negative feedback to hotel customers. New investment opportunities come after overall service quality in third place since boutique hotels would like to become bigger, chain hotels using strategic alliances, mergers, acquisitions and have more than one branch nationally or internationally to increase their total revenue and reputation. The ability to profit from government incentives and subsidies are important.

Chain Hotels

“Overall service quality” criteria take the first place since customers want to find the same quality and standardization in all chains, both nationally and internationally. Secondly, chain hotels brand image and reputation are very important, because high brand value and awareness shortly direct customers to that brand name without spending too much time in hotel selection process. A chain hotel brand name can sell itself since people buy the brand. Brand image and brand reputation should be protected. Thirdly, sales techniques that would be used in “sales calls” gain important, the manner need to be professional. Sales techniques take the third place since less emphasis on sales techniques is required compared to the overall service quality of the hotel and brand management tactics, since people automatically buy the brand.

Restaurants

Sales techniques like menu item pricing, menu design technique, or changing menu content with new recipes takes the first place among other criteria since they create first impressions. Secondly, eco-friendly entrepreneurship like recycling process, hygiene, and food safety practices, healthy food opportunities support sustainable growth since customers pay much more attention to “green marketing” nowadays (Choua et al., 2012). Indeed, restaurants need to create comfortable, aesthetic, and eco-friendly environments using different innovation tactics. Third, the customers’ overall impression of a restaurant’s physical environment design is much more important compared to that of a boutique or chain hotel. Brand image creates support for the overall reputation of a restaurant.

6. Limitation and future research

The sampling data was obtained from only 13 chain and boutique hotels covering 69 hotel executive officers and 47 restaurant managers located in Ankara, Istanbul, Turkey. More sampling data could be obtained in order to increase the validity and reliability of the results. Moreover, beside hotel and restaurants, other hospitality subsidiaries like rent a car firms, airlines, travel agencies might be included in data profile and in comparative analysis.

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