

Assessment of Green Supplier Choosing in Tourism, A case study of 4* and 5* Tehran Hotels

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Abstract

Environmental management cause managers induce to make green supply chain management in business field which is a tool for forecasting, planning, performance and control process to do customer's needs. In Tourism section, the staff tourism are attempting to find solutions to increase their competitive advantage in competitive environment. Tourism green supply chain management is one of the strategies that tourism firms can be used to increase their competitive advantage. Supplier choosing is one of the key decisions in green supply chain management, which reveal the importance of environmental protection. Due to Tehran is the first tourism destination in Iran and tourism activities lead to environmental pollution, this study has presented a comprehensive framework to examining green development in 4 and 5* hotels in Tehran. For this, the Delphi method is used to determine criteria and is evaluated the green development by four criteria: Green design, green procurement, reverse logistics, green management. Finally, it is used Fuzzy AHP method to weight the index and criteria of green supply chain management in 4-star and 5-star in hotel in Tehran. The results indicate that Green management and is the most important index to being green hotel.*

Keywords: *Green supply chain management, tourism green supply chain management, fuzzy AHP, Tehran hotels.*

JEL Classification: C02, C44, C88, D70, O18, O21, Z32, Z39.

1. Introduction

The highly competitive environment of the tourism industry will lead the active businesses in the field of tourism to seek the new approaches to improve their competitive advantages (Zhang et al., 2009). Therefore, the supply chain management is one of the processes that can be applied in any organization to focus on the competitive advantages in all work processes (Huang et al., 2012; Yang et al., 2009). The supply chain management is the management and the coordination of any complex network of activities involved in delivering the final product to the customer (Fortes, 2009).

Green supply chain management is represented as an approach to balance the competitive circumstances (Tseng & Geng, 2012). In addition, it is a tool for the processes prediction, planning, execution, and control within the supply chain to meet the customers' needs by applying the efficient techniques. The supply chain management examines the coordination, integration, product control and financial affairs within the organization and among the partners (Tigu & Calaretu, 2013).

Many changes have occurred in the business environment and the efforts have been made to lower the costs of goods and services to reach customers (Odoom, 2012). Furthermore, in the tourism sector, the actors are apt to seek the highly competitive approaches to find some solutions to increase their competitive advantage in this sector. The effective tourism supply chain management is considered as one of the strategies that the active businesses in the field of tourism can use to increase their competitive advantage (Zhang et al., 2009).

Hotels are one of the actors of tourism that can use this approach in their business environment (Yang et al., 2009, Tigu & Calaretu, 2013). One of these approaches in the hospitality industry is the logistics and the supply chain system. An appropriate system can help the hotel industry due to the sustainable competitive advantages in this field. The proper use of the supply chain not only can improve the quality of services in the hotels, but also it reduces the prices (Odoom, 2012).

2. Literature Review

2.1. Green supply chain management concept

Green supply chain management is derived from the literature of the environmental management and the supply chain management. The addition of the concept of the green supply chain management includes the impact and the relationship between the supply chain management and the natural environment (Srivastava, 2007). Zhu et al. (2005) define the green supply chain management as an event, in which the integrated green supply chain incurs from the suppliers to manufacturers, to the customers and towards the reverse logistics. Green supply chain management emphasizes the environmental concerns within the long-term needs of the supply chain and the strategic cooperation between the supply chain members. Green supply chain management covers the product lifecycle management in production and consumption, until its life expires (Liu et al., 2012).

Green supply chain management is seen in four perspectives: a. Management and use of the environment; b. recycling, reuse and replacement of material; c. Practice, monitor and improve environmental performance in the supply chain; d. Product design, manufacturing process, the final product reaches into the consumer and life management product after end of useful life and reverse logistics (Sarkar, 2012).

2.2. Tourism supply chain management

Tourism supply chain is defined a network of the active organizations in the field of tourism, whereas a range of the different activities from the different tourism goods/services to the distribution and marketing of the final tourism product at a particular destination are supported and it includes a wide range of the participants in both divisions of the public and private sectors (Zhang et al., 2009). In other words, the tourism supply chain includes the suppliers of all goods and service, which are active in the field of the delivery of the tourism products to the tourists. Green supply chain management in the hotel industry includes three main divisions: green manufacturing, green procurement and green distribution, while today these practices are the most important strategies that aid the relevant companies to achieve higher profits and market share through the green practices (Odoom, 2012). The conceptual framework is represented by Hervani et al. (2005) to study the framework of the green supply chain management. It is assumed that the elements of the green supply chain management as the green suppliers, green manufacturing, green operations, reverse logistics and finally waste management (Figure 1) (Amemba, 2013; Nikbakhsh, 2009; Hervani et al., 2005).

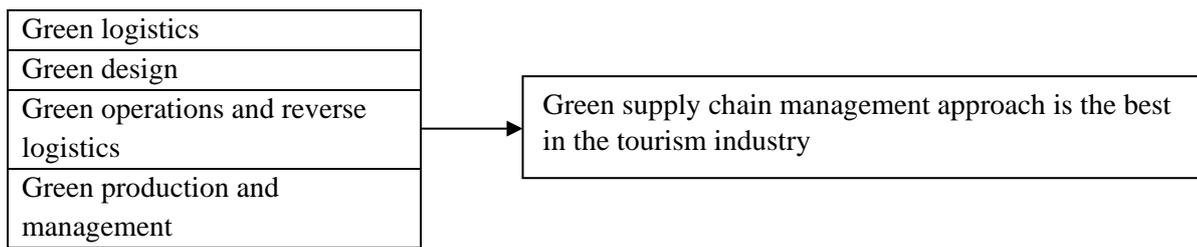


Figure 1. Elements of Green supply chain management; By: (Amemba, 2013)

2.3. Green design

Green design is seen as one of the major and minor issues in the green supply chain management, whereas it means that the complete environmental, human health and product safety description should be assessed in the process of the raw material acquisition, production, and distribution and it aims to prevent any source pollution via the environmental awareness. Green design evaluates the systematic product design and its production process in respect to the product effects on the health and the environmental safety over the product lifecycle (Nikbakhsh, 2009; Srivastava, 2007; Hu & Hsu, 2010; Hervani et al., 2005; Liu et al., 2012; Amemba, 2013; Fortes, 2009; chin & shih, 2007). Green design seeks to minimize the consumption of materials and energy in compliance with the environment and the facilitation of reuse and recycling (Green et al., 2012).

2.4. Green procurement

Green procurement is one of the ordinary plausible dimensions in Green Supply Chain Management. The facilitation of resource recycling, reuse and reduction is a concept of green logistics that is focused and embraced (Laosirihongthong et al., 2013). By applying this dimension, the large number of suppliers may be reduced by very strict environmental quality standards. In other words, green procurement can lead to the economic value (Min & Galle, 2001; Nikbakhsh, 2009; Amemba, 2013). Green procurement is an environmental dimension that includes the participation in the reductive, reuse and recycling activities (Amemba, 2013). Therefore, it is a critical and important factor for the suppliers, because it leads to cost saving and the improvement of the public perception (Zhu & Geng, 2006; Rao, 2002; Srivastava, 2007).

Suppliers in green procurement focus on the development of the environmentally friendly products (Green et al., 2012; Gordon Murray, 2000).

2.5. Reverse logistics

The reverse logistics activities are different from the traditional logistics. The logistics network includes many general features, e.g. the requirement of coordination between two markets, the uncertainty of supply and postponement (Amemba, 2013). The reverse logistics management process consists of planning, management and monitoring the waste stream for the reuse or final disposal of waste (Hu et al, 2002). These operations are less developed and studied (Sarkis, 2003).

Reverse logistics is defined as the planning process to effectively use and control the flow of raw materials in the manufacture of the finished goods and the relevant information from the product consumption to the return of the raw materials with the aim of obtaining the initial value of the returned product (Nikbakhsh, 2009, Tibben & Rogers, 1998). In the reverse logistics, the producers consider how the products have reverse flow at the end of the life cycle and such issue is possible in the supply chain management (Helms & Hervani, 2006, Fortes, 2009). Reverse logistics can be considered as the transport of

those goods and products with the reversibility. The logistics includes the integrated inspection, selection, sorting, reprocessing, direct recovery, and redistribution (Ninlawan, 2010; Sirvastava, 2007).

2.6. Green production and management

Green products include the process of those products with very least environmental impacts and low waste generation that are highly efficient and effective (Amemba et al., 2013). In general, green production and management aims to reduce the environmental impact of the products and the designed and consumed products entail the minimum damage to the environment (Nikbakhsh, 2009; Amemba, 2013). Green management can lead to lower raw material costs, improvement of productivity, reduction of safety and environmental costs, and improvement of the company image (Ninlawan, 2010; Srivastava, 2007).

3. Methodology

The analytic hierarchy process (AHP) is a multiple criteria decision making (MCDM) tool to render subjective judgment on one criteria over another. This method which was proposed primarily by Saaty (1980), Usage of eigenvalue approach to the pairwise comparison matrix derived from the scaling ratios to find the relative weight importance among the criteria subjective and objectives of the hierarchy system (Akincilar & Dagdeviren, 2014; Chang et al., 2008). Though the AHP is very much able to deal with the expert's knowledge and experiences by perception or preference, it still cannot reflect the human thought totally with the crisp numbers (Das et al., 2012; Liao, 2011). However, due to the complexity and uncertainty involved in real world decision problems, it is sometimes unrealistic or even impossible to require exact judgments. It is therefore more natural or realistic that a decision maker (DM) is allowed to provide fuzzy judgments instead of precise comparisons (Lee et al., 2015; Lee et al., 2011). The Fuzzy AHP can overcome such inability by handling linguistic variables or numerical value about the importance of each performance attribute (Chou et al., 2008; Li et al., 2012).

The Fuzzy AHP approach needs cumbersome computation process. It is much more systematic and it used as an efficient method for handling the fuzziness of the data involved in deciding the preferences or judgments of different decision variables, selection, evaluation, planning and development, forecasting, and so on (Sezhian et al., 2011; Wang et al., 2014), which reflect better the ambiguity of human thinking (Anagnostopoulos & Petalas, 2011). In this method, the pairwise comparisons of criteria and alternative in the judgment matrix are fuzzy numbers that are modified by the decision-makers emphasis. Moreover, this method helps decision-makers usually find that it is more confident to give interval judgments than fixed-value judgments (Bozbura & Beskese, 2007).

In order to deal with the uncertainty and vagueness from the subjective perception and the experience of humans in the decision making process, many FAHP methods are proposed by various authors. This section of study employed trapezoidal fuzzy numbers approach to gain a weight estimation, which incorporates the fuzzy set theory into AHP while dealing with the linguistic terms measures in the questionnaire survey.

Buckley (1985) initiated trapezoidal fuzzy numbers to express the DM's evaluation algorithm on subcriteria. FAHP is implemented through the following steps (Pourahamd et al., 2015).

Assign linguistic terms to the pairwise comparisons by asking, which is the more important of each two dimensions (Sun, 2010). Matrix *A* of experts is constructed according to the pairwise comparison that can be expressed as: In this method for pairwise comparison of options, fuzzy numbers and to obtain values and superiorities, geometric averaging method were used. Because this method can generalized simply to fuzzy condition. Also, determine an integrate response for pairwise comparison. In this way, the decision maker can express pairwise comparisons of each level in the form of trapezoidal fuzzy numbers (TFN). For example the TFN of (4,5,5,6) indicating the superiority of about 1 to 5 and the number (5,6,8,9) indicates the superiority between about 1 to 6 and about 1 to 8 (Table 1).

Table 1. Trapezoidal fuzzy numbers of linguistic variables

Trapezoidal Fuzzy Numbers (TFN)	Trapezoidal Fuzzy Reciprocal Numbers
(La)	$(L_{1/a})$
$(a - Lb)$	$(1/a - L_{1/b})$
$(La - b)$	$(L_{1/a} - 1/b)$
$(La - Lb)$	$(L_{1/a} - L_{1/b})$

To express a geometric averaging method for determining values in fuzzy condition at first it is necessary to mention the method in classic mode. To do this, consider the following matrix pair comparison (Eq. 1).

$$A = \begin{bmatrix} 1 & a_{12} & \dots & a_{1n} \\ a_{21} & 1 & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \dots & 1 \end{bmatrix} = \begin{bmatrix} 1 & a_{12} & \dots & a_{1n} \\ 1/a_{21} & 1 & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ 1/a_{n1} & 1/a_{n2} & \dots & 1 \end{bmatrix} \quad (1)$$

The geometric mean of each row is calculated as (Eq. 2):

$$Z_i = \left[\prod_{j=1}^n a_{ij} \right]^{\frac{1}{n}} \text{ for } j, k = 1, 2, \dots, n \quad (2)$$

The weight element W_i is constructed as (Eq. 3):

$$W_i = \frac{Z_i}{(Z_1 + Z_2 + \dots + Z_n)}, \forall_i \quad (3)$$

To facilitate the calculation of fuzzy weights, the following arithmetic operations of trapezoidal fuzzy number (TFN) are presented. A TFN can be defined as $\tilde{M}_1 = (a; b; c; d)$ where $0 \leq a \leq b \leq c \leq d$ its membership function is as follows (Eq. 4):

$$\mu_{\tilde{Q}}(X) = \begin{cases} 0 & \text{if } x \leq a \text{ or } x \geq d \\ 1 & \text{if } b \leq x \leq c \\ a \in [0,1] & \text{if } a \leq x \leq b \\ a \in [0,1] & \text{if } c \leq x \leq d \end{cases} \quad (4)$$

Let $\tilde{M}_1 = (a_1, b_1, c_1, d_1)$ and $\tilde{M}_2 = (a_2, b_2, c_2, d_2)$ be two TFNs. Some main operations of fuzzy numbers \tilde{M}_1 and \tilde{M}_2 can be expressed as follows (Eqs. 5-9) (Chen, Lin, & Huang, 2006; Pourahamd et al., 2015):

$$\tilde{M}_1 + \tilde{M}_2 = (a_1 + a_2, b_1 + b_2, c_1 + c_2, d_1 + d_2) \quad (5)$$

$$\tilde{Q} = \tilde{M}_1 \times \tilde{M}_2 = (a[L_1, L_2], b, c, d[R_1, R_2]) \quad (6)$$

$$a = a_1 a_2, b = b_1 b_2, c = c_1 c_2, d = d_1 d_2 \quad (7)$$

$$L_1 = (b_1 - a_1)(b_2 - a_2), L_2 = a_2(b_1 - a_1) + a_1(b_2 - a_2) \quad (8)$$

$$R_1 = (d_1 - c_1)(d_2 - c_2), R_2 = -[d_2(d_1 - c_1) + d_1(d_2 - c_2)] \quad (9)$$

To defuzzify the TFN $\tilde{M}_1 = (a_1, b_1, c_1, d_1)$, the following (Eq. 10) can be calculated:

$$Z^* = \frac{\int \mu_{\tilde{c}}(z) \cdot z \, dz}{\int \mu_{\tilde{c}}(z) \, dz} \quad (10)$$

The steps of the fuzzy AHP algorithm can be summarized as follows (Pourahamd et al., 2015):

Step 1. Each expert made an evaluation for the relative importance of the criteria using on pairwise comparisons. The experts denote their judgments on the basis of their experiment and knowledge. The questionnaire is prepared based on pairwise comparison using linguistic terms (Table 1).

Step 2. criteria aggregated fuzzy trapezoidal averaging operator which were established by the experts (Eq. 11)

$$\tilde{X}_{ik} = \frac{1}{K} [\tilde{X}_{ik}^1 \oplus \tilde{X}_{ik}^2 \oplus \dots \oplus \tilde{X}_{ik}^k] \quad (11)$$

Eq. (3) was calculated to obtain the aggregation of the linguistic terms. Where K is the number of experts and \tilde{X}_{ik}^k is the evaluation of the K th decision maker on the pairwise importance comparison of i th and k th criteria.

Step 3. Determine the fuzzy weights \tilde{W}_i . The derivation of \tilde{Z}_i values (Eq. 2) and fuzzy weights \tilde{W}_i (Eq. 3) can be detailed as follows (Eqs. 12 and 13). Let:

$$a_i = \left[\prod_{j=1}^n a_{ij} \right]^{1/n} \quad (12)$$

and

$$a = \sum_{i=1}^m a_i \quad (13)$$

Similarly, we can define b_i and b , c_i and c , and d_i and d . Then, the fuzzy weight \tilde{W}_i is obtained as (Eq. 14):

$$\tilde{W}_i = \left(\frac{a_i}{d}, \frac{b_i}{c}, \frac{c_i}{b}, \frac{d_i}{a} \right) \quad (14)$$

Step 4. Defuzzification is a mathematical process performed to convert fuzzy output into a crisp value. The advantage of the COA method is that all activated membership functions of the conclusions take part in the defuzzification process (Pourahamd et al., 2015). In this study we used to the COA method for the defuzzification process. The COA method applies the following Eq. (15):

$$Z^* = \frac{\int \mu_{\tilde{c}}(z) \cdot z \, dz}{\int \mu_{\tilde{c}}(z) \, dz} \quad (15)$$

Where Z^* is the crisp value for the “z” output and $\mu_{\tilde{c}}(z)$ is the aggregated output membership function.

In this study, it were obtained collection of 4 data dimensions and 22 selection of criteria by Delphi method to examined green supply chain management in the 4-star and 5-star hotels in Tehran (Table 2). The

goal is to select the best or priority option, index and criteria of green supply chain management hotels and weighted them.

Table 2. Dimensions and criteria for green supply chain management

Dimension	Criteria
Green Design	<i>Waste management (D1)</i> <i>Separate circuit (D2)</i> <i>Renewable resources (D3)</i> <i>Electronic eye tap (D4)</i> <i>Design with natural environment (D5)</i> <i>Pollution decline (D6)</i> <i>Recycling (D7)</i> <i>Energy efficiency label (D8)</i>
Green Procurement	<i>LED Lamp (P1)</i> <i>Solar Energy (P2)</i> <i>Biogas (P3)</i> <i>Rainwater harvesting and storage (P4)</i> <i>Not using CFC (P5)</i>
Reverse Logistic	<i>Train passengers (L1)</i> <i>Environmental protect (L2)</i> <i>Saving consumption (L3)</i>
Green Management	<i>Waste handler (M1)</i> <i>Composting (M2)</i> <i>Collected waste water (M3)</i> <i>Water management (M4)</i> <i>ISO certified (M5)</i> <i>Quality management (M6)</i>

4. Results

Green supply chain management focuses on the environmental concerns the long-term needs and the strategic cooperation between the members of the supply chain. Green supply chain management covers the lifecycle management of a product from production towards consumption until the lifecycle ends (Table 3).

Table 3. Pairwise comparisons of dimension

Dimension	Green Design	Green Logistics	Reverse procurement	Green Management	Weights
Green Design	(1,1,1)	(2/3,1,3/2)	(1,3/2,2)	(1/2,2/3,1)	0.281
Green Procurement	(2/3,1,3/2)	(1,1,1)	(1,1,1)	(2/5,1/2,2/3)	0.155
Reverse Logistic	(1/2,2/3,1)	(1,1,1)	(1,1,1)	(1,1,1)	0.145
Green Management	(1,3/2,2)	(3/2,2,5/2)	(1,1,1)	(1,1,1)	0.416

According to the survey results among the elite experts and managers of the hotels, the green management index has the most significance and the green design criteria has the secondary significance in the services supply chain and the reverse logistics index has the lowest significance among the indices. Green management includes an information and technological system, thereby it leads to the management and strategic decision-making in the smaller sections of the hotels. Therefore, the macro-management decisions based on the ecological principles in the green hotel chain implies many impacts and the implementation of many ecological principles in the hotel is finally based on the management and the managers' investment. Furthermore, the different hotel sections are required to comply with the environmental standards at the international level, which is seen as the further management requirements that leads to the green hotel activities (Table 4).

Table 4. Pairwise comparisons of green design criteria

Green Design	D1	D2	D3	D4	D5	D6	D7	D8	W
D1	(1,1,1)	(5/2,3,7/2)	(1/3,2/5,1/2)	(2/3,1,3/2)	(1/2,3/4,1)	(1,1,1)	(3/2,2,5/2)	(2/3,1,3/2)	0.158
D2	(2/7,1/3,2/5)	(1,1,1)	(2/5,1/2,2/3)	(1,1,1)	(1,1,1)	(1,4/3,2)	(2/3,1,3/2)	(1/4,2/7,3)	0.014
D3	(2,5/2,3)	(1,1,1)	(1,1,1)	(1,3/2,2)	(1,3/2,2)	(1,1,1)	(1,1,1)	(1,1,1)	0.193
D4	(2/3,1,3/2)	(1,1,1)	(1/2,2/3,1)	(1,1,1)	(1/2,3/4,1)	(1,1,1)	(2/3,1,3/2)	(1,1,1)	0.057
D5	(1,4/3,2)	(1,1,1)	(1/2,2/3,1)	(1,4/3,2)	(1,1,1)	(1/4,2/7,1/3)	(2/7,1/3,2/5)	(2/7,1/3,2/5)	0.022
D6	(1,1,1)	(1/2,3/4,1)	(1,1,1)	(1,1,1)	(3,7/2,4)	(1,1,1)	(1,1,1)	(1,1,1)	0.146
D7	(2/5,1/2,2/3)	(2/3,1,3/2)	(1,1,1)	(1,1,1)	(5/3,3,7/2)	(1,1,1)	(1,1,1)	(3,7/2,4)	0.207
D8	(2/3,1,3/2)	(3,7/2,4)	(1,1,1)	(1,1,1)	(5/3,3,7/2)	(1,1,1)	(1/4,2/7,1/3)	(1,1,1)	0.200

The comparison of the green design criteria as the second most important effective factor in the green supply chain management of the hotels implies that having a green recycling system will so much help to sustain the green criteria of this chain. In fact, recycling plays an important role in the product life cycle (Fortes, 2009). According to the result, green design has achieved the highest score (0/207) (Table 5).

Table 5. Pairwise comparisons of green procurement criteria

Green Procurement	P 1	P 2	P 3	P 4	P 5	Weights
P 1	(1,1,1)	(1/3,2/5,1/2)	(2/3,1,3/2)	(1,4/3,2)	(1,3/2,2)	0.128
P 2	(2,5/2,3)	(1,1,1)	(1,3/2,2)	(2/3,1,3/2)	(3/2,2,5/2)	0.380
P 3	(2/3,1,3/2)	(1/2,2/3,1)	(1,1,1)	(1,1,1)	(1/2,3/4,1)	0.090
P 4	(1/2,3/4,1)	(2/3,1,3/2)	(1,1,1)	(1,1,1)	(2/5,1/2,2/3)	0.174
P 5	(1/2,2/3,1)	(2/5,1/2,2/3)	(1,4/3,2)	(3/2,2,5/2)	(1,1,1)	0.220

As it is mentioned in the literature, the green logistics lead to the green production (Nikbakhsh, 2009). As a result, the consistent green infrastructures are one of the most common ways of the green supply chain management (Amemba, 2013). According to the results of the present study, the use of solar energy as one of the effective and efficient approaches implies the maximum rating of 0.38 and the lack of use of CFCs in different sections of the hotel implies the second rating of 0.22. The use of the energy-saving bulbs is rated with the minimum score of 0.128. In fact, it is the simplest strategy, which should be complied in the hotels (Table 6).

Table 6. Pairwise comparisons of green management criteria

Green Management	M 1	M 2	M 3	M 4	M 5	M6	Weights
M 1	(1,1,1)	(1, 3/2,2)	(1/2,3/4,1)	(2/3,1,3/2)	(1,3/2,2)	(3/2,2,5/2)	0.205
M 2	(1/2,2/3,1)	(1,1,1)	(1/2,3/4,1)	(1,1,1)	(1/2,3/4,1)	(3/2,2,5/2)	0.157
M 3	(1,4/3,2)	(1,4/3,2)	(1,1,1)	(1,1,1)	(2/3,1,3/2)	(1,3/2,2)	0.182
M 4	(2/3,1,3/2)	(1,1,1)	(1,1,1)	(1,1,1)	(1,3/2,2)	(1/2,2/3,1)	0.157
M 5	(1/2,2/3,1)	(1,4/3,2)	(2/3,1,3/2)	(1/2,2/3,1)	(1,1,1)	(2/3,1,3/2)	0.140
M6	(2/5,1/2, 2/3)	(2/5,1/2,2/3)	(1/2, 2/3,1)	(1,3/2,2)	(2/3,1,3/2)	(1,1,1)	0.156

In the present study, the waste handler system in the 4 and 5-star hotels, due to the extensive higher performance and the visitors, leads to the more waste production, in which the priority is the weight of 0.205, moreover Nikbakhsh (2009) mentioned it to the importance of waste handler system to being green the hotels. From the staff's perspective, Tehran faces with the shortage of water resources, while the great complexes, e.g. hotels, with large external green spaces shall have the requirement of the wastewater collection system that indicated the weight of 0.182. Finally, after a series of the basic operations under the environmental certifications and the quality management of the services, which are considered as the important and significant issues in the green management (Table 7).

Table 7. Pairwise comparisons of reserve logistic criteria

Reverse Logistic	L 1	L 2	L 3	Weights
L 1	(1,1,1)	(1,4/3,2)	(2/3,1,3/2)	0.368
L 2	(1/2,3/4,1)	(1,1,1)	(2/3,1,3/2)	0.298
L 3	(2/3,1,3/2)	(2/3,1,3/2)	(1,1,1)	0.333

In many activities, the reverse logistics is seen as one of the important basic principles (Fortes, 2009). According to the previous studies, the environmental certification "ISO 14000" requires to settle the specific rules and requirements (Curkovic & Sroufe 2011, Zhu et al., 2005). One of the requirements is the staff training and the environmental compliance to remind the travelers in the hotels within the policy making of this sector. In the present study, the travelers training index includes the weight of 0.368 at the first priority and the environmental protection with the weight of 0.298 at the last priority.

5. Conclusion

The present study is conducted to rank the index of the Green Supply Chain Management in 4- and 5-star hotels in Tehran. Based on the literature review and Delphi method, as the main index are divided into 22 categories of criteria in 4 groups: green design, green logistics, reverse logistics and green management standards. After the questionnaire was designed in the form of pairwise comparisons using AHP and gathering the experts' and senior executives' opinions in 4 and 5-star hotels in Tehran, the rating was carried out. After the Fuzzy of expert's opinion questionnaire, results was obtained from the opinions and the calculations of weighting according to fuzzy AHP method and the priorities of each index was determined in these hotels. In this study, Green management has allocated highest score and reserve logistic is lowest score. Green management describes the construction of hotels. The strategy of green management is the new method for establishing a reputation for one self. The concept of green management consists of waste handler, water management and ISO environmental certification, compost management and sewage system. Green design is the second important item. Green design in the hotel is related to waste separation, renewable source, pollution decline, electronic eye tap, recycling, and energy efficiency label. Among these criteria recycling is the most important. All these parameter could make the hotels get the lowest degree to influence the environment and cause to reach sustainable development. The third important index is Green procurement. In this sector, hotels should use LED lamp, solar energy, biogas, Rainwater harvesting and storage and eliminating of CFCs. Equipping of hotels to solar energy can really save energy, and this will help hotels lower the cost and effectively plus help the earth. The final effective item in hotel supply chain management is reverse logistic. This includes train tourists, environmental protect and saving consumption which training is the most important item.

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