

# Applying Fuzzy AHP to Evaluate the Key Selection Criteria for Green Hotel Operation Managers

Chien-Chung Yu<sup>1</sup>, Chun-Chu Liu<sup>2,\*</sup>

<sup>1</sup>Department of Tourism and Recreation Management, Fooyin University, Taiwan

<sup>2</sup>College of Continuing Education, Chang Jung Christian University, Taiwan

\*Corresponding author: [lcc@mail.cjcu.edu.tw](mailto:lcc@mail.cjcu.edu.tw)

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**Abstract** In the past few decades, environmental sustainability has become the most important issue in international politics. Green issues are recognized as a key driver of innovation. As green marketing has become an important tool for sustainable business strategies, the hotel service industry has become more sophisticated in terms of service quality due to consumer awareness. Companies are adopting green marketing practices to achieve better business performance. Therefore, the professional ability and workplace attitude of professional managers of green hotels have become an important human resource management direction in the operation strategy. When green hotels are selecting professional managers, how should decision-makers choose the talents needed by green hotels? This article uses Fuzzy AHP to explore the impact. Twelve senior hotel industry experts evaluate the impact under six dimensions. The weight of the degree, knowing that "execution" is the priority factor, it is more important to choose "implementation" among the 19 key indicators, and it is also necessary to have "communication ability", the crisis under the "communication ability" Handling ability, "Customer complaint response", and "Workplace interpersonal relationship" are also important indicators for selection. The conclusions and recommendations of this study are the key selection criteria for green hotel operation managers.

**Keywords:** Fuzzy AHP, green hotel, operation managers, green human resources

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## 1. Introduction

### 1.1. Background

In recent years, Taiwan has added many newly-created characteristic hotels, focusing on cultural and creative value-added, service innovation to improve overall satisfaction. Therefore, it is found that the professional quality of hotel managers is more obvious. It indicates that professionalism and attitude operation managers own are crucial for human resource (HR) in relation with hotel operation strategy. Green hotel owners who use management strategy to recruit suitable operation managers may take advantage of social science theory as the base of management and recruitment resulting in lesser enterprise resource.

### 1.2. Motivation

Found that many hotel owners or the management officials care much about selection and recruitment of operation managers from either internal promotion or external hiring and this is critical for overall HR

management and manpower training. Baker, Davis and Weaver [1] showed that hotels should strengthen "green marketing", implement "sustainable environment" and improve "environmental education" to enforce the perception and preference of green hotels and establish a green hotel market positioning. pointed out that in the service industry, such as hotels, their green efforts include reducing waste, saving energy and water in operations, and educating customers and employees [2,3]. Therefore the researcher managed to have interviews with hotel seniors to explore the phases and the contents of such recruitment guide for operation managers in the hotel industry.

### 1.3. Purpose of the Study

When the green hotel industry selects operations directors, most of them are determined by the highest-level directors of the business system in their companies. Operation managers are supposed to be creative, innovative and productive who can make a team with systemic thinking and vision to meet their position requirements. How to become a good green hotel manager candidate during selection. The purpose of the study is to explore what recruitment

guide is in practice to select operation managers and what quality to be a right candidate by means of fuzzy AHP.

## 2. Literature Review

### 2.1. Fuzzy AHP Study

To make complex decision involving uncertain elements, Thomas L. Saaty, a professor at the University of Pittsburg developed a systemic model called analytic hierarchy process (AHP) in 1971. AHP method makes complicated problems into a systemic hierarchy. Ray Wang [4] used AHP to study green hotel development in Taiwan. Green hotel practices include a commitment to environmental protection, recycling and reuse, improved energy use efficiency, water resource use efficiency and protection, landscape greening, hazardous and toxic substance management, supply chain transportation, and green procurement.

A Competencies Mode examined hotel competence model and developed a scale with 99 items after studying literature reviews as well as collection of experts' comments. After retrieving questionnaires, seven key factors were derived as they were self management, strategic attitude, executive power, critical thinking, communication skill, interpersonal ability and leadership. Laarhoven and Pedrycz [5] pioneered the improvement of the traditional AHP hierarchy method and added the fuzzy set theory proposed by Zadeh [6] to solve the uncertainty and fuzzy data theory in the real environment. Logical concepts to describe the degree of importance of things, This research uses fuzzy analytic hierarchy process to confirm the professional ability factors of green hotel operation managers, and constructs a discussion on the relationship between the two levels of analytic hierarchy process.

In recent years from the direction of operation development of companies, it is understood that green consumers have become very important, because on the one hand, marketing strategies must convey the green purchasing model, and on the other hand, the design of products and services must conform to the green concept [7]. Ting et al. [8] It is pointed out that consumers' awareness of environmental protection and energy saving concepts has prompted enterprises in the hotel industry to adopt green operations as their development direction.

Han and Yoon [9] The research believes that the establishment of a good reputation by the accommodation industry with green practices will help increase visibility and increase consumers' environmental awareness, which in turn induces consumers' green consumption concepts and attitudes in daily life, and ultimately increases their willingness to green accommodation. In order to create a normal profit-making model for the sharing economy, recycle, reduce, and reuse are the main axes of development principles. According to the Green Hotels Association, Green Hotels are committed to introducing environmentally friendly facilities that save energy, water, solid waste and pollution in addition to saving operating expenses [10].

### 2.3. Operation Manager

Management divided into three roles including executives, managers and supervisors. Since operation managers know more about the substantive operation, they can execute strategy more effectively which make them a crucial role in performing new concepts and resource allocation [11]. Operation management is critical because work planning and execution as well as the business development of each unit in any organization are the basis of the operating phase. Kumar [12] found that the three cores of green marketing are marketing, operation management and sustainable development. The development of green marketing has become an important strategy for sustainable business.

Any green hotel operation manager, no matter who is recruited outbound or promoted inwardly within keen competitive environment, is destined to encounter some problems such as unfamiliarity with subordinates or issue of stakeholder interest. In particular, green hotel operation managers are required to control personal emotions as well as that of employees. When it comes to personality, green hotel operation managers are supposed to be aggressive, flexible, agile, patient, creative, social as well as kind, service-orientated and coordinate. Though operation managers are core players to some extent, they struggle between the top and the bottom within the organization.

### 2.4. Green Human Resources

Human Resource Development is well accepted nowadays. HR is defined as first resource for knowledge economy that can be used to evaluate a national power as a vital indicator. Green human resource management (GHRM) is an emerging field of practice of human resource management in recent years, and extends out from environmental thinking, mainly focusing on the environment and resources, and making a significant contribution to sustainability [13]. The theme of human resource management in hotel environmental management is still relatively important. Moreover, Green Human Resources development and need of operation managers in any organization is so important that their training and performance are to meet organization's expectations and needs. In a word, the role of operation manager is significantly imperative to any organization.

Human resources are the backbone of any successful organization, and GRHM's concepts of green management incentives and protection of intellectual assets have far-reaching effects on social sustainability and organizational productivity [14]. Green "management model" cultivates employee's green environmental awareness. For companies in the development of green marketing model, if the employees have green concept, in their "work processes" of production and business operation, they will consciously use advanced technology to reduce the waste and use of resources, and try to reduce the consumption of water and electricity energy and paper. GRHM emphasizes efficiency, reducing waste, improving workplace interaction attitudes, balancing work-life relationships, improving employee performance and retention, in order to achieve the goal of sustainable use of resources and sustainable development of society [15].

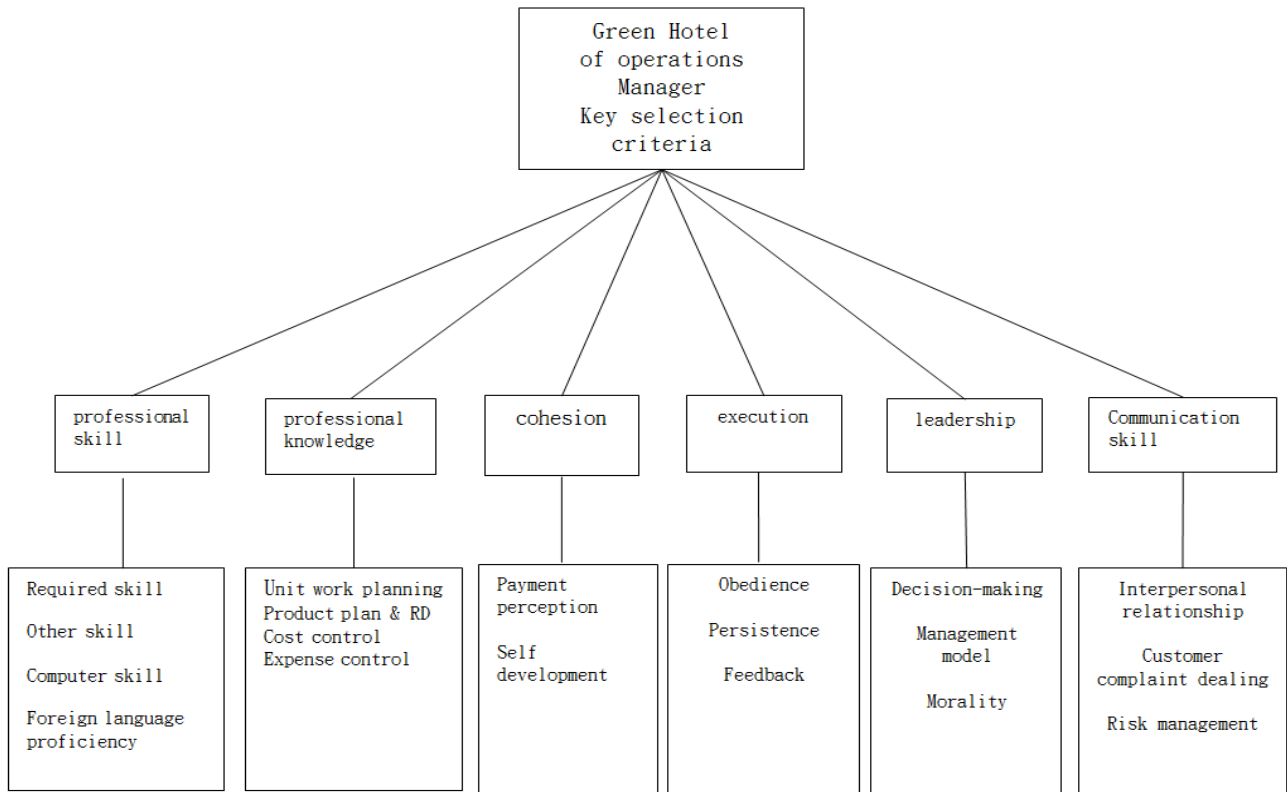


Figure 1. Hierarchy structure (compiled by the researcher)

### 3. Methodology and Design

#### 3.1. Structure

According to the motivation and purpose, the study structure is illustrated after collecting, sorting and analyzing data as the Figure 1.

#### 3.2. Hypothesis and Hierarchy of Factor

After analyzing the literature reviews and opinions provided by green hotel experts, key factors for recruitment guide of operation managers are identified. By means of Fuzzy AHP, such factors are stratified. In other words, analysis is made according to importance, priority and difference of each factor. The variables include two stages, as shown in the following table:

Table 1. comprehensive factor hierarchy

Facet index	Evaluation indicators
Professional skill(A-1)	Required skill-have such certification and related experience (B1-1).
	Other skill-other skill and certification in addition to required one (B1-2).
	Computer skill-have multicomputer skill (B1-3).
	Foreign language proficiency-can speak English or other foreign languages (B1-4).
Professional knowledge (A-2)	Unit work planning-can plan and operate the very unit (B2-1).
	Product plan & RD-can plan & RD for product (B2-2).
	Cost control-can control cost in its unit (B2-3).
	Expense control-can control expense in its unit (B2-4).
Cohesion(A-3)	Payment perception-accept the payment arrangement (B3-1).
	Self development-concern promotion and career development (B3-2).
Execution(A-4)	Obedience-comply with HR regulation and management system (B4-1).
	Persistence-execute the work assigned by the senior (B4-2).
	Feedback-report or respond for any assignment (B4-3).
Leadership(A-5)	Decision-making-decision is beneficial to its company(B5-1).
	Management model-build a team that is coherent and cohesive as well as coordinate and cooperative (B5-2).
	Morality-leadership that is fair, just and open (B5-3).
Communication skill(A-6)	Interpersonal relationship-horizontal and vertical relationship with coworkers (B6-1).
	Customer complaint dealing-the manner and skill to deal with customers (B6-2).
	Risk management-can manage any contingency and risk (B6-3).

Source: compiled by the researcher.

**Table 2. Result: the average of the sum from 12 experts**

Layer A (n=6)			Layer B(n=19)			Weight(C)=(A)*(B)	
Dimension	Weight(A)	Rank	Evaluation	Weight(B)	Rank	Weight(C)	Rank
Professional skill (A-1)	0.0648	6	Required skill	0.0276	13	0.00179	15
			Other skill	0.0135	18	0.00087	18
			Computer skill	0.0094	19	0.00061	19
			Foreign language proficiency	0.0143	17	0.00093	17
Professional knowledge (A-2)	0.0882	5	Unit work planning	0.0279	12	0.00246	12
			Product plan & RD	0.0170	16	0.00150	16
			Cost control	0.0212	15	0.00187	14
			Expense control	0.0222	14	0.00169	13
Cohesion (A-3)	0.2156	4	Payment perception	0.0546	10	0.01177	11
			Self development	0.1610	1	0.03470	2
Execution (A-4)	0.2803	1	obedience	0.0878	6	0.02460	6
			persistence	0.1400	2	0.03925	1
			feedback	0.0526	11	0.01473	8
Leadership (A-5)	0.2264	3	Decision making	0.0583	8	0.01321	9
			management model	0.0578	9	0.01309	10
			morality	0.1103	3	0.02497	5
Communication skill(A-6)	0.2802	2	Interpersonal relationship	0.0895	5	0.02507	4
			Customer complaint dealing	0.0807	7	0.02261	7
			Risk management	0.1100	4	0.03082	3

Source: compiled by the study.

## 4. Results and Analysis

Key selection criteria for green hotel operations executives. Recruitment guide for green hotel managers is analyzed resulting from 12 questionnaires. After weighting Fuzzy AHP, the results are presented per Table 2, including the priority of each factor and their ranking.

Based on the Table 2, the results are analyzed as follows:

(1) Among the six key indicators that affect the selection of green hotel operations managers at level A, it is found that "execution" has the greatest influence on the selection of green hotel operations managers, which is the first priority, followed by "communication power". The least influential factor is "professional skills."

(2) There are nineteen items in the B-level evaluation indicators. Through the measurement of data, it can be seen that the "implementation" in the "execution" has the highest impact on the selection criteria of the green hotel operation manager, followed by the "centripetal force". Self-development", and the least impact is "computer clerical ability" in "professional skills".

(3) Affecting the key selection criteria of green hotel operation managers at level A, "communication ability" is also an important indicator of selection.

## 5. Conclusion and Suggestions

The recruitment guide evaluated by 12 hotel experts will be a useful objective for those who are eager to be green hotel operations managers. Finally in north, central and south area a collection of experts' review was compiled so it reached with reliability and validity to verify after analyzing and compiling their comments. The conclusion is that green hotel operations managers should

take interpersonal relationships, customer complaint handling and risk management as the primary factors. This result emphasizes the importance of interpersonal relationships, which should be related to Robert L. Katz [16]) match the declared core capabilities. A successful manager has the following three core competencies: (1) technical skills, (2) interpersonal skills, (3) conceptualization skills.

Interpersonal skill are use leadership, encouragement and communicating to achieve organizational goals. The managers have good interpersonal relationship to get a hand. They are good at communicating, encouraging and guiding who can inspire enthusiasm and build confidence. Such skill is crucial for the operations managers. For "professionalism" under various selection indicator dimensions, the requirements are the smallest to measure conditions, while the "computer clerical ability" under the "professional skills" dimension is considered very low, because computer clerical ability is already a very popular job Skill requirements, therefore, senior managers believe that "professional skills" are a prerequisite for being a supervisor. Therefore, the important functional directions to be promoted to an operation supervisor should be execution, communication, leadership, and centripetal force.

## References

- [1] Baker, M. A., Davis, E. A., and Weaver, P. A., (2014). Eco-friendly Attitudes, Barriers to Participation, and Differences in Behavior at Green Hotels, *Cornell Hospitality Quarterly*, 55(1), 89-99.
- [2] Bohdanowicz, P., Zientara, P., Novotna, E. (2011). International hotel chains and environmental protection: an analysis of Hilton's we care! programme (Europe, 2006-2008) *J. Sustain. Tour.*, 19 (2011), pp. 797-816.
- [3] Rahman, I., Reynolds, D., Svaren, S. (2012). How green are North American hotels? An exploration of low-cost adoption practices *Int. J. Hosp. Manag.*, 31 (2012), pp. 720-727.

- [4] Wang, R. (2012). The investigation of Green Best Practices for Hotels in Taiwan. International Conference on Asia Pacific Business Innovation and Technology Management. *Procedia - Social and Behavioral Sciences*, 57 (2012), 140-145
- [5] Laarhoven, P.J.M.Van., Pedrycz, W. (1983). A fuzzy extension of Saaty's priority theory. *Fuzzy Sets and Systems*. Volume 11, Issues 1-3, 1983, Pages 229-241.
- [6] Zadeh, L.A. (1973). Outline of a New Approach to the Analysis of Complex Systems and Decision Processes. *IEEE Transactions on Systems, Man, and Cybernetics* (Volume: SMC-3, Issue: 1, Jan. 1973).
- [7] Sharma, A., Foropon, C. (2019). Green product attributes and green purchase behavior: A theory of planned behavior perspective with implications for circular economy. *Management Decision*, 57, 4, 1018-1042.
- [8] Ting, C.T., Hsieh, C.M., Chang, H.P., & Chen, H.S. (2019). Environmental Consciousness and Green Customer Behavior: The Moderating Roles of Incentive Mechanisms Sustainability 2019, 11 (3), 819.
- [9] Han, H., Yoon, H.J. (2015). Hotel customers' environmentally responsible behavioral intention: Impact of key constructs on decision in green consumerism. *International Journal of Hospitality Management*. Volume 45, February 2015, Pages 22-33.
- [10] Kim, Y.J., Kim, W.G., Choi, H.M., Phetvaroon, K. (2019). The effect of green human resource management on hotel employees' ecofriendly behavior and environmental performance. *International Journal of Hospitality Management* 76 (2019) 83-93.
- [11] Kanter, R.M. (1985). Supporting innovation and venture development in established companies. *Journal of Business Venturing*, 1, 47-60.
- [12] Kumar, P. (2016). Green marketing consumer-level theory review: A compendium of applied theories and further research directions State of green marketing research over 25 years (1990-2014): Literature survey and classification. *Marketing Intelligence & Planning*, 34, 1, 137-158.
- [13] Opatha, H.H.D.N.P. (2013). Green Human Resource Management A Simplified Introduction, *Proceedings of the HR Dialogue*, 1, 1, 11-21.
- [14] Tariq, S., Jan, F.A., & Ahmad, M.S. (2016). Green employee empowerment: a systematic literature review on state-of-art in green human resource management. *Qual Quant*. 50 (2016), 237-269.
- [15] Saragih, S.R., Margaretha, M. (2013). *Anteseden dan Konsekuensi Employee Engagement: Studi pada Industri Perbankan*. In: Seminar Nasional & Call for Paper: Perkembangan Kewirausahaan dan Tantangannya dalam Menghadapi Perekonomian Indonesia di Masa yang Akan Datang, 19-20 Juni 2013, Bandung.
- [16] Katz, R.L. (1955). Skill of An Effective Administrator, *Harvard Business Review*, 33, pp.33-42.
- [17] Robbins, S.P., Coulter, M. (2008). *Management* (10th ed.). Upper Saddle River, N.J.: Pearson Prentice Hall.



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