

**The Journal of  
Mathematics and Computer Science**

Available online at

<http://www.TJMCS.com>

The Journal of Mathematics and Computer Science Vol .2 No.2 (2011) 348-358

**An study some of the factors affecting on relationship quality  
employee - customer in the hotel industry by Fuzzy logic**

**Seyed Alireza Mousavi<sup>1,\*</sup>, Maryam Ashraf<sup>2</sup>, Parisa Rajaey<sup>3</sup>, Nahid Moones Toosi<sup>4</sup>**

*Islamic Azad University of Firouzabad, Ali\_mosavi75@yahoo.com*

*Islamic Azad University of Qeshm; maryamashraf506@yahoo.com @yahoo.com*

*Islamic Azad University of Qeshm, prajaey@gmail.com*

*Islamic Azad University of Qeshm, na\_moones@yahoo.com*

Received: July 2010, Revised: November 2010

Online Publication: January 2011

**Abstract**

Considering the developments and increasing competition in the world marketing progress from those who can strong relationship with customers and quality to establish this relationship focus on the needs of customers Expectations skills to deal their staff satisfaction, confidence in the loyalty make customers are. The aim of the paper test a model of the some factors affecting the relationship quality employee – customer by Fuzzy logic.

**Keywords:** Relationship marketing, relationship quality, Competitive strategy, Fuzzy logic

---

<sup>1,\*</sup> Assistant Professor of Marketing Management

<sup>2</sup> Senior Student of Master of Marketing Management

<sup>3</sup> Senior Student of Master of Marketing Management

## 1. Introduction

Customer relationships have received considerable attention from both academicians and practitioners. The increasing emphasis of relationship marketing is based on the assumptions that building committed customer relationships results in guest satisfaction, loyalty, positive word of mouth, business referrals, references, and publicity. Intense competition for market share in today's market requires managers to attend to customer retention and the how or why of a patron returning and continuing to repurchase [16]. Business growth key of each organization and its success is having continuously relationship with mutual trust with customers. Customer retention is founded on the quality of the relationship established with them, which in turn, is based on the customers' evaluations and perceptions about their personal communication with the employees and how the latter behave. Specifically, relationship marketing is crucial in the services sector, since it provides services with tangibility [2,7].

The relationship marketing strategy also offers a sustainable competitive advantage, since the intangible factors in a relationship are not easily imitated by competitors [12,19]. The high level of competition in the hotel industry is reflected by increasingly narrow margins and growing pressure to offer more and better services, with rising costs as a logical consequence. But at the same time, firms attempt to control costs so as not to add weight to the decline in margins. This costs tension transfers to the hotel managers.

A way of confronting this problem is to try to retain customers and encourage a pattern of continuous repurchase, since retaining one customer is more profitable than acquiring another [18]. Thus, when marketing efforts have an increased focus on customer retention the likelihood of them becoming more efficient is greater [17]. Customer retention is founded on the quality of the relationship established with them, which in turn, is based on the customers' evaluations and perceptions about their personal communication with the employees and how the latter behave. The relationship marketing strategy also offers a sustainable competitive advantage, since the intangible factors in a relationship are not easily imitated by competitors [12].

Relationship marketing in the hotel industry consists of a set of marketing activities designed to attract, maintain and improve relationships with customers for mutual benefit [1]. Customer retention plays an important role in this strategy. Relationship quality is considered as an overall assessment of the strength of a relationship and captures the essence of relationship marketing [9]. Although discussion regarding the conceptualization of relationship quality remains unresolved, there is agreement that relationship quality is a "higher-order construct consisting of several distinct, although related dimensions" [7] and different dimensions need to be combined to an overall relationship quality measure [24]. Crosby, Evans, and Cowles (1990) develop a relationship quality model that examines the nature, antecedents, and consequences of relationship quality as perceived by customers from the life insurance industry. Relationship quality is viewed as a two-dimensional construct composed of trust in the salesperson and satisfaction with the salesperson. Kim and Cha (2002) investigate the antecedents affecting relationship quality between hotel employees and customers and the consequences influenced by the relationship quality. In the hospitality industry, even though those positive effects are recognized, there is a lack of specific research and, due to this; there are no detailed indications of how appropriated management of RQ antecedents could be used to produce desired and expected results. The objective of this study is ranging the antecedents (customer orientation, relational orientation, mutual disclosure, and service providers' attributes) affecting relationship quality between hotel employees and customers by fuzzy TOPSIS.

5 Customer Oriented is kind of organizational culture that makes suitable behaviors to create best value in product or service according to customer expectation and look at its activities and services instead of customer and organize its activity to increase customer satisfaction [5].

Relational Orientation (RQ) has been defined as the "degree of appropriateness of a relationship to fulfil the needs of the customer" [8] and from the customer's perspective it is achieved through the employee's ability to reduce the perceived uncertainty. Therefore, RQ captures the positive/negative nature of a relationship, which, in turn, provides the customer with positive benefits [13].

Relationships in which Mutual Disclosure (MD) occurs will, in most contexts, lead to desirable outcomes. Derlega et al. (1987) remarked that among the behaviors often noted as important in establishing and maintaining interpersonal relationships is MD. This is a communication style involving willingness to reveal personal information and helps to develop trust as personal and/or business information is exchanged between the parties [4]

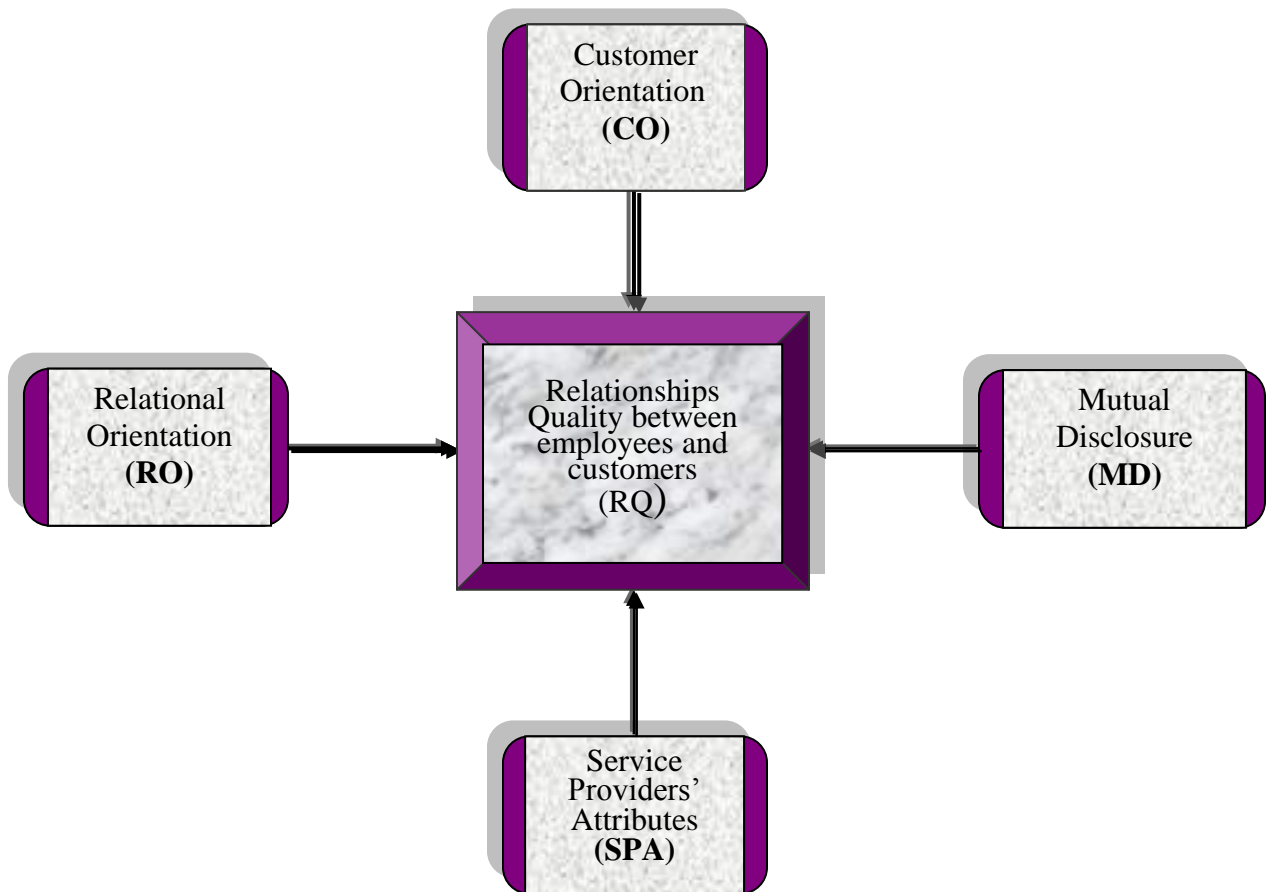
In each encounter with the service provider, whatever the medium (post, internet or face-to-face), the customer forms an impression about its quality. Thus, if each encounter is positive, these attribute swill all contribute to global satisfaction and the desire to continue with the relationship in the future [3]. Among the most important service provider attributes in the hotel sector, employee appearance and experience are well-known [6].

13

Research Model

According to the nature of multi-dimensional discussions about relationships quality with customer, we used a conceptual model that was designed to evaluate linkage between customer orientation, relational orientation and mutual disclosure with relationships quality by [22] to rank this model by TOPSIS Fuzzy.

Figure 1. Conceptual Model



14

## Methodology

There are various models for prioritizing factors in research. The most important models are multiple criteria decision making (MCDM) models such as analytic hierarchy process (AHP), technique for order preference by similarity to ideal solution (TOPSIS), etc. In this paper, we try to apply Fuzzy TOPSIS model, introduced by Chen (1997) for ranking the variable of employee-customer relationship quality in the hotel industry .

TOPSIS is an operational design approach that helps select the optimal levels of antecedents affecting relationship quality. This technique can be extremely useful for service design. Similarly, loss function is better suited to highlight the future long-term damage caused by not delivering on customer-defined service standards [14]. TOPSIS views a multi-attribute decision-making problem with  $m$  alternatives as a geometric system with  $m$  points in the  $n$ -dimensional space. The method is based on the concept that the chosen alternative should have the shortest distance from the positive-ideal solution and the longest distance from the negative-ideal solution. In the meanwhile, since the judgments from experts and humans are usually vague rather than crisp, therefore a judgment should be expressed by using fuzzy sets which have the capability of representing vague data [11].

Fuzzy TOPSIS is a methodology that extends TOPSIS for decision making to cases conducted in uncertain and fuzzy environment; thus, providing the ability to deal with the uncertainty of human judgments in evaluating the factors affecting in relationship between employees and customers in the hotel industry. The study sample society was randomly selected from the hotels customers of Qeshm free zone. The reason for this selection was Questionnaires were distributed among a sample size of 300 customer, among which 200 questionnaires were returned and proper for use (return rate of 80 per cent). Table I shows the characteristics of the sample society.

### Questionnaire development, validity and reliability

In order to ranking the employee-customer relationship quality in the hotel industry in Qeshm free zone, factors were driven from the specific model [22]. The required data were gathered in the form of a questionnaire asking the respondents to choose the importance of them mentioned factors affecting relationship quality between hotel employees and customers factors based on Likert scale, with rankings of : 1 strongly disagree; 2 disagree; 3 apathetic; 4 agree; 5 strongly agree. Prioritizing the factors was done using the Fuzzy TOPSIS.

**Table I. Sample characteristics**

Factor	Frequency	Percentage
<b>Age (years)</b>		
20 to 29	55	27.5
30 to 39	72	36
40 to 49	58	29
Over 50	15	7.5
<b>Gender</b>		
Male	125	62.5
Female	75	37.5
<b>Education</b>		
Under Diploma	43	21.5
Diploma	52	26

Bachelor	98	49
Master and higher level	7	3.5

The numerical value of each linguistic term used in the questionnaire, was determined based on Table II [21], using a fuzzy approach. Fuzzy sets theory acts as a very powerful tool to address the uncertainty and imprecision issue which affects Priority importance of quality customer relationships. Fuzzy logic ensures a mathematical precise approach to deal with the Vagueness that may feature the importance of a criterion or relative judgment of people. As it can be seen in Table II, the solid 5 scale linguistic term has been transformed to equal fuzzy intervals. Because the questionnaire used in this research had already been used in previous studies [22], its validity is confirmed. In order to test the reliability of the questionnaire, Cronbach's alpha was found to be 0.775, which indicated that the questionnaire has high internal reliability.

### Measurement with fuzzy set

The subject of relationship quality is burdened by fuzzy terms or buzzwords (e.g. attitude, taste, atmosphere), and respondents may fill out the questionnaire subjectively based on their unique experience or personal characteristics. This subjective assessment is intrinsically imprecise and ambiguous [23]. To reflect the subjectivity and imprecision in the survey, the assessment made by the respondents can be represented as fuzzy sets [25]. Fuzzy set theory, initially introduced by Zadeh (1965), is used to manage the vagueness of human thought, since it can represent vague expressions such as "usually," "fair" and "satisfied," which are regarded as the natural representation of respondents' preference and judgment. The theory also enables the application of the fuzzy domain in mathematics and programming. A fuzzy set is a class of objects with a continuum of membership degrees, characterized by a membership function which assigns a membership grade ranging between zero and one to each object [10\*].

In classical set theory, an object is either a member of a set or excluded from it. Thus, in conventional dual logic, a statement can only be either true or false. In reality, however, human cognition, perception and judgment involve approximate and vague reasoning, and cannot be modeled adequately by classical set theory. Fuzzy sets were introduced by Zadeh (1965) as a method of handling vagueness or uncertainty; particularly linguistic variables. Fuzzy sets consider the grey area of data, rather than considering membership of a set to be simply true or false. In other words, fuzzy sets allow partial membership of a set. There are two main characteristics of fuzzy systems that give them better performance for specific applications [11].

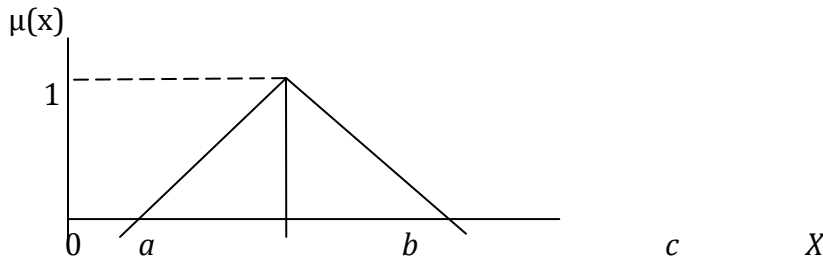
1) fuzzy systems are suitable for uncertain or approximate reasoning, especially for the system with a mathematical model that is difficult to derive; and

(2) fuzzy logic allows decision-making with estimated values under incomplete or uncertain information That is why fuzzy logic has been combined and used along with TOPSIS, and has resulted in a Fuzzy TOPSIS methodology for reviewing ranking the employee-customer relationship quality in the hotel industry in Qeshm free zone. The following seven steps, based on the technique introduced by Chen (1997), are used for this research purpose in ranking the employee-customer relationship quality in the hotel

industry. The mathematics concept borrowed from Hsieh, Lu, and Tzeng (2004) and Liou et al. (2007). A fuzzy number  $\tilde{A}$  on  $R$  to be a TFN if its membership function  $\mu(x)_{\tilde{A}}: R \rightarrow [0,1]$  is equal to following Eq. (1):

$$\mu(x)_{\tilde{A}} = \begin{cases} (x-a) / (b-a), & a \leq x \leq b \\ (c-x) / (c-b) & b \leq x \leq c \\ 0 & , \text{ otherwise} \end{cases}$$

From Eq. (1),  $L$  and  $U$  mean the lower and upper bounds of the fuzzy number  $\tilde{A}$ , and  $M$  is the modal value for  $\tilde{A}$  (as Fig. 1). The TFN can be denoted by  $\tilde{A}_1 = (a, b, c)$ . The operational laws of TFN  $\tilde{A}_1 = (a_1, b_1, c_1)$  and  $\tilde{A}_2 = (a_2, b_2, c_2)$  are displayed as following Eqs. (2)–(6)



Comparing with the traditional investigative research, the importance degree for the serving attribute used 5-points of Likert Scale, applying TFN that the utilization of linguistic variables is rather widespread at the present time, and the linguistic values found in this study are primarily used to assess the linguistic ratings given by the evaluators. According to the nature of TFN and the extension principle put forward by Zadeh (1965), the algebraic calculation of the triangular fuzzy number.

Addition of triangular fuzzy number  $\oplus$

$$(a_1, b_1, c_1) \oplus (a_2, b_2, c_2) = (a_1 + a_2, b_1 + b_2, c_1 + c_2) \quad (2)$$

Multiplication of a triangular fuzzy number  $\otimes$

$$A.(a_1, b_1, c_1) \otimes (a_2, b_2, c_2) = a_1a_2, b_1b_2, c_1c_2 \quad \text{For } a_1, a_2 > 0; b_1, b_2 > 0; c_1, c_2 > 0 \quad (3)$$

A. Any real number  $k$

$$K \otimes (a, b, c) = (K, K, K) \otimes (a, b, c) = (Ka, Kb, Kc) \quad (4)$$

Subtraction of a triangular fuzzy number  $\ominus$

$$(a_1, b_1, c_1) \ominus (a_2, b_2, c_2) = (a_1 - a_2, b_1 - b_2, c_1 - c_2) \quad (5)$$

Division of a fuzzy number  $\emptyset$

$$(a_1, b_1, c_1) \emptyset (a_2, b_2, c_2) = (a_1/a_2, b_1/b_2, c_1/c_2) \quad \text{For } a_1, a_2 > 0; b_1, b_2 > 0; c_1, c_2 > 0 \quad (6)$$

Reciprocal of the fuzzy number

$$\tilde{A}^{-1} = (a_1, b_1, c_1)^{-1} = (1/a_1, 1/b_1, 1/c_1) \quad \text{For } a_1, a_2 > 0; b_1, b_2 > 0; c_1, c_2 > 0 \quad (7) [6^*]$$

As it has said, in Table II, the solid 5 scale linguistic term has been transformed to equal fuzzy intervals.

Table II. Fuzzy range and numbers

Linguistic terms	Fuzzy number
1	(0,0,2)
2	(0,2,4)
3	(3,5,7)
4	(6,8,10)
5	(8,10,10)

**Step one**

Consider a fuzzy decision matrix of respondents' ideas as follows, where i stands for the number of factors (factors affecting relationship quality between hotel employees and customers ) and j stands for the number of respondents.

Also,  $\tilde{X}_{ij}$  stands for the score assigned by respondent number i for factor j. On the other hand,  $\tilde{W}_{ij}$  is the importance (weight) of each respondent's ideas. It must be added that, because all the respondents are considered to have the same weight,  $\tilde{W}_{ij}$  will be defined as  $\tilde{W}_j \frac{1}{n}; 1 \leq j \leq n$ :

$$\tilde{D} = \begin{bmatrix} \tilde{x}_{11} & \tilde{x}_{12} & \dots & \tilde{x}_{1n} \\ \tilde{x}_{21} & \tilde{x}_{22} & \dots & \tilde{x}_{2n} \\ \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ \tilde{x}_{m1} & \tilde{x}_{m2} & \dots & \tilde{x}_{mn} \end{bmatrix}$$

$$\tilde{X}_{ij} = (a_{ij}, b_{ij}, c_{ij})$$

$$\tilde{W} = [w_1, w_2, \dots, w_n]$$

**Step two**

This step includes neutralizing the weight of decision matrix and generating fuzzy un-weighted matrix ( $\tilde{R}$ ). To generate  $\tilde{R}$ , either of the following relations can be applied.

Relation 1

$$\tilde{R}_{ij} = [rij] = \left( \frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*} \right)$$

where:

$$c_j^* = \max c_{ij}$$

Relation 2

$$\tilde{r}_{ij} = \left( \frac{a_j^-}{c_{ij}}, \frac{a_j^-}{b_{ij}}, \frac{ca_j^-}{c_{ij}} \right)$$

where:

$$a_j^- = \min a_{ij}$$

### Step three

This step includes generating fuzzy un-weighted matrix ( $\tilde{v}_{ij}$ ), while having  $\tilde{w}_{ij}$  as an input for the algorithm:

$$\tilde{V} = [\tilde{v}_{ij}]_{m \times n} \quad i = 1, 2, \dots, m \quad ; \quad j = 1, 2, \dots, m$$

$$\tilde{v}_{ij} = \tilde{r}_{ij} \cdot \tilde{w}_j \quad i = 1, 2, \dots, m, \quad j = 1, 2, \dots, n,$$

### Step four

Determine positive ideal (FPIS,  $A^+$ ) and negative ideal (FNIS,  $A^-$ ) for the factors:

$$A^+ = (\tilde{v}_1^*, \tilde{v}_2^*, \tilde{v}_3^*, \dots, \tilde{v}_n^*) = \{ \max v_{ij} \mid (i = 1, 2, \dots, m, j = 1, 2, \dots, n) \}$$

$$A^- = (\tilde{v}_1^-, \tilde{v}_1^-, \tilde{v}_1^-, \dots, \tilde{v}_1^-) = \{ \min v_{ij} \mid (i = 1, 2, \dots, m, j = 1, 2, \dots, n) \}$$

In this research, the positive and negative ideas introduced by Chen (1997) are used.

Therefore:

$$\tilde{v}_j^* = (1, 1, 1)$$

$$\tilde{v}_j^- = (0, 0, 0)$$

### Step five

In this step, we calculate the sum of distances from positive and negative ideas for each factor.

For fuzzy numbers such as A and B, the difference between A and B shown as  $D(A, B)$ , is determined using the following formula:



$$\tilde{b} = (b_1, b_2, b_3), \quad \tilde{a} = (a_1, a_2, a_3)$$

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

Therefore, the difference of each factor from positive and negative ideals is calculated:

$$d_i^* = \sum_{j=1}^n d(\tilde{v}_{ij} - \tilde{v}_j^*) / n \quad i = 1, 2, \dots, m$$

$$d_i^- = \sum_{j=1}^n d(\tilde{v}_{ij} - \tilde{v}_j^-) / n \quad i = 1, 2, \dots, m$$

### Step six

The adjacency of each factor to positive ideal is calculated as the following:

$$CC_i = \frac{d_i^-}{d_i^* + d_i^-}, \quad (i = 1, \dots, m)$$

### Step seven

This is the final step where we rank factors in a descending order of. Therefore the higher CCi go to top[15].

## Findings

The findings of this research shows that “mutual disclosure” has most of effect on quality relationship between employees and customers and hotels of Qeshm are considered it as the most important quality factors in the perspective of hotels customers (Table III). Interestingly, “customer orientation” has been selected as the least important quality relationship factor by respondents.

Table III. Ranking factors of affecting relationship quality between hotel employees and customers

Variables	Rank Factor	d*	d-	CCi
mutual disclosure	1	53.172	159.769	0.750
service providers' attributes	2	64.015	148.841	0.699
relational orientation	3	92.884	118.088	0.559
customer orientation	4	102.487	152.829	0.551

## Conclusion and suggestions

This research used a questionnaire driven from( Verdugo et al.,2009) model and analyzed by

Fuzzy TOPSIS methodology to review and rank the factors effect on quality relationship between employees and customers in the hotel industry in qeshm free zone. the findings of this research shows that “mutual disclosur” the most high ranking in quality between employees and customers , hotels have qeshm And customer orientation is the lowest rating According to importance of service providers' attributes (second rank), managers of hotels should focus on their human resource and increase employees' ability in dealing with customer by training, reward and punishment system and apply in long-term strategy of their hotels. Complementary of above model can be used in other research at future and consequences of the relation quality can be modeled. Other industry can be investigate to gather more witnesses and strengthen of model.

## References

- [1] Berry, L.L. and Parasuraman, A. (1991), *Marketing Service – Competing Through Quality*, The Free Press, New York, NY.
- [2] Berry, L.L., 1983. Relationship marketing. In: Berry, L.L., Shostack, L.K., Upah, G.D. (Eds.), *Emerging Perspectives on Services Marketing*. American Marketing Association, Chicago, pp. 25– 28.
- [3] Bitner, M.J. (1995), “Building service relationships: it’s all about promises”, *Journal of the Academy of Marketing Science*, Vol. 23, pp. 246-51.
- [4] Boles, J.S., Brashear, T., Bellenger, D. and Barksdale, H. Jr (2000), “Relationship selling behaviors: antecedents and relationship with performance”, *Journal of Business & Industrial Marketing*, Vol. 15, pp. 141-53.
- [5] Brown, T.J., Mowen, J.C., Donovan, T. and Licata, J.W. (2002), “The customer orientation of service workers: personality trait effects on self- and supervisor performance ratings”, *Journal of Marketing Research*, Vol. 34, pp. 110-9.
- [6\*] Dagdeviren, M. et al., (2009) “Weapon selection using the AHP and TOPSIS methods under fuzzy environment” *Expert Systems with Applications*, Vol. 36, PP 8143–8151.
- [6] Desombre, T. and Eccles, G. (1998), “Improving service quality in HHS trust hospitals: lessons from the hotel sector”, *International Journal of Health Care Quality Assurance*, Vol. 11, pp. 21-6.
- [7] Gronroos, C., 1990. Relationship approach to marketing in service contexts: the marketing and organizational behavior interface. *Journal of Business Research* 20 (1), 3–11.
- [8] Hennig-Thurau, T. and Klee, A. (1997), “The impact of customer satisfaction and relationship quality on customer retention: a critical reassessment and model development”, *Psychology & Marketing*, Vol. 14, pp. 737-64
- [9] Jap, S. D., Manolis, C., & Weitz, B. A. (1999). Relationship quality and buyer–seller interactions in channels of distribution. *Journal of Business Research*, 46, 303–313.
- [10] Juwaheer, T.D. and Ross, D.L. (2003), “A study of hotel guest perceptions in Mauritius”, *International Journal of Contemporary Hospitality Management*, Vol. 15, pp. 105-15.
- Kim, W.G. and Cha, Y. (2002), “Antecedents and consequences of relationship quality in hotel industry”, *International Journal of Hospitality Management*, Vol. 21, pp. 321-38.
- [10\*] Kahraman, C., Tolga, E. and Ulukan, Z. (2000), “Justification of manufacturing technologies using fuzzy benefit/cost ratio analysis”, *International Journal of Production Economics*, Vol. 66, pp. 45-52.
- [11] Kahraman, C., Ates, N.Y. and Cevik, S. (2007), “Hierarchical fuzzy TOPSIS model for selection among logistics information technologies”, *Journal of Enterprise Information Management*, Vol. 20 No. 2, pp. 143-68.
- [12] Lee, Y., Park, K., Park, D., Lee, K. and Kwon, Y. (2005), “The relative impact of service quality on service value, customer satisfaction and customer loyalty in Korean

family restaurant context”, *International Journal of Hospitality and Tourism Administration*, Vol. 6, pp. 27-50.

[13] Macintosh, G. (2007), “Customer orientation, relationship quality, and relational benefits to the firm”, *Journal of Services Marketing*, Vol. 21, pp. 150-9.

[14] ) Mukherjee, A. and Nath, P. (2005), “An empirical assessment of comparative approaches to service quality measurement”, *Journal of Services Marketing*, Vol. 19 No. 3, pp. 174-84.

[15] Nejati et al ., (2009), “Ranking airlines’ service quality factors using a fuzzy approach: study of the Iranian society”, *International Journal of Quality & Reliability Management* Vol. 26 No. 3, pp. 247-260

[16] Pritchard, M.P., Howard, D.R., 1997. The loyal traveler: examining a typology of service patronage. *Journal of Travel Research* 35 (4), 2-10

[17] Sheth, J.N. and Parvatiyar, A. (1995), “Relationship marketing in consumer markets: Antecedents and consequences”, *Journal of the Academy of Marketing Science*, Vol. 23, pp. 255-71.

[18] Reichheld, F. and Sasser, W.E. (1990), “Zero defections: quality comes to services”, *Harvard Business Review*, Vol. 68, pp. 105-11.

[19] Roberts, K., Varki, S. and Brodie, R. (2003), “Measuring the quality of relationships in consumer services: an empirical study”, *European Journal of Marketing*, Vol. 37, pp. 169-96.

[20] Tsang, N. and Qu, H. (2000), “Service quality in China’s hotel industry: a perspective from tourists and hotel managers”, *International Journal of Contemporary Hospitality Management*, Vol. 12, pp. 316-26.

[21] Tso Lin, H. (2010), “Fuzzy application in service quality analysis: An empirical study” *Expert Systems with Applications*, Vol. 37, pp 517- 526.

[22] Verdugo, M. and Veerapermal, N. “The employee-customer relationship quality Antecedents and consequences in the hotel industry” *International Journal of Contemporary Hospitality Management*, Vol. 21, pp. 251-274.

[23] Williams, R.H. and Zigli, R.M. (1987), “Ambiguity impedes quality in the service industries”, *Quality Progress*, July, pp. 14-17.

[24] Walter, A., Muller, T. A., Helfert, G., & Ritter, T. (2003). Functions of industrial supplier relationships and their impact on relationship quality. *Industrial Marketing Management*, 32, 159- 169.

[25] Yeh, C.H. and Kuo, Y.L. (2003), “Validating fuzzy multicriteria analysis using fuzzy Clustering”, *International Journal of Operations & Quantitative Management*, Vol. 9 No. 3, pp. 161-75.