

Customer loyalty program based on quality function deployment with fuzzy linguistic preference relation

T. H. Hsu¹, L. Z. Lin² and S. Y. Chiu³

^{1,3}*Department of Marketing and Distribution Management, National Kaohsiung University of Science and Technology, Kaohsiung, Taiwan.*

²*Department of Marketing Management, Shih Chien University Kaohsiung Campus, Taiwan.*

thhsu@nkust.edu.tw, lingzhong@g2.usc.edu.tw, liyinglin23@gmail.com

Abstract

The competition among shopping malls is getting increasingly more intense. In order to enhance corporate competitiveness and profitability, how to retain key loyal customers has become an important issue for the managers of shopping malls. Customer loyalty programs are a universal practice. This study proposes an analytical model for developing the strategic management of customer loyalty programs. Based on quality function deployment, our model constructs a fuzzy relational matrix to integrate the customer benefits and the customer loyalty programs. The results contribute to a better understanding of the different importance of customer benefits with respect to “Utilitarian benefits”, “Hedonic benefits” and “Symbolic benefits”. The study’s findings provide prioritized customer loyalty programs, including “Newest information transmissions,” “Communication service specialists,” “Exclusive free gift promotions,” and “VIP lounge service,” which can be used to determine the directions for the improvement of shopping malls. The study has implications for the theory and practitioners. First, it allows the integration of customer benefits in customer loyalty programs and the consideration of VIP customers in the programs. Second, the requirement evaluation considering fuzzy linguistic preferences allows for prioritizing the customer loyalty programs when dealing with uncertainty and vagueness. Finally, this approach helps to obtain more realistic results by integrating fuzzy decision-making into QFD.

Keywords: Customer loyalty program, QFD, fuzzy linguistic preference relations, shopping center.

1 Introduction

The recent change of global consumption patterns in the past few years has given big shopping center owners a developmental opportunity to demonstrate their capabilities to combine leisure, shopping, food and beverage and entertainment in a shopping center in order to entertain shoppers. According to survey data from the Department of Statistics the Ministry of Economic Affairs of Taiwan [8], the revenues of the department store industry occupy the highest proportion among the five big retailing industries. The annual average was at least 27% each year from 2011 to 2015, and its sales scale ranks in the first place among the retail sales of nonspecialized stores. In addition, the Market Intelligence and Consulting Institute (MIC) report on basic department store information indicated that the number of department stores and shopping centers reached 143 stores, which is a 15 unit increase in comparison to the previous year [17]. This reveals that the numbers of both department stores and shopping centers have simultaneously increased, but the total number of shopping centers in Taiwan has risen quicker in relation to the number of department stores since 2012. The phenomenon reflects the active level of the overall retailing industry and its importance to the commercial environment in Taiwan.

The retailing industry has entered into a highly competitive age following the overall fast development of the industry. For example, in Kaohsiung City in Taiwan, there were 15 shopping centers in 2015, including Dram Mall, E-Da Asia Plaza, Global Mall at Xinzuoing Station and the new Taroko Park. In dealing with the aggressive competitive

environment, the industry needs to devote resources to improving the overall service quality and must use different ways to enhance its competitive advantages. Moreover, the major trend of the relationship marketing also allows the industry to turn its attention to customers and focus on the maintenance, management and development of customer relationships. Therefore, a series of customer relationship management plans (i.e., customer loyalty programs) that encourage loyal customers [9] and maintain profitable customers [4] were gradually developed. Verhoef [27] considered that a customer relationship management plans as a kind of relationship marketing tool that will affect a business's customer retention and market occupation rate. Wirtz et al. [33] also believed that customer relationship management plans can effectively build and maintain the relationships between a business and its customers. Past empirical studies verified that there are many benefits for a business that endeavors to retain loyal customers. Tanford [24] showed that the acquisition of new customers can cost five times more than retaining current customers. Gupta and Lehmann [12] found that a business can achieve 5% additional profits when customers' repetitive purchase rate increases by 1%. Briggs and Grisaffe [4] also indicated that a business's overall profits can rise from 35% to 95% if its retention rate or customer loyalty rate increases by 5%. Gronroos [11] suggested that the long-term relationship and customer loyalty between an organization and a customer are an important assumption for the modern business model, and advanced information technology can help managers to provide customer relationship management (CRM) as a new generation of tactics for customer loyalty programs.

Kumar [13] identified that the popularity of relationship marketing makes a service business capture its customers by providing relationship management plans (customer loyalty programs). Relevant studies also identified that customer loyalty programs can provide a business with obvious increases in their revenues [14], customer satisfaction [16] and customer loyalty [18, 19]. Thus, customer loyalty programs are very effective and practical methods that can be performed using credit cards or special scanner-readable cards. When customers use these cards, they can receive many benefits, such as price discounts, members only deals, free gifts after passing a predetermined spending threshold, redeemable points, and eligibility for drawings or contests [20].

The study used loyal customers who hold VIP memberships from a big shopping center in Taiwan as the research objects in order to explore different types of customer benefits and the customer preferences for each type of benefit. The suggested approach overcomes the vagueness and uncertainty that are faced in weighting customer requirements, considering that the analysis model implements a more effective loyal program management strategy. Therefore, the purposes of the study are as follows: (1) to explore the type of customer benefits that are offered by customer loyalty programs of shopping centers, (2) to examine customer preferences and the importance level of each type of perceived benefit from loyalty programs, and (3) to integrate the QFD developmental process with the fuzzy linguistic preference relation method in order to help the shopping center develop a suitable customer loyalty program management analysis tool and find the optimal fitness between its program's technical ability and the customer benefit requirements.

2 Construction of FQFD in customer benefit and customer loyalty programs

Quality function deployment (QFD) is a customer-driven quality management system that aims to create higher customer satisfaction. The basic concept of QFD is to translate the customer requirements into product developments or advanced service techniques. Each translation uses a matrix called the house of quality (HoQ). When the customer values and requirements become complicated and diversified, the information that is derived from the HoQ becomes unclear [30]. Therefore, value perceptions are adopted in the fuzzy linguistic process in order to evaluate the attribute weights of customer values [21]. To deal with the obscure and imprecise linguistic data, fuzzy set theory combined with QFD, which is called FQFD, could be used to improve the quality of the responsiveness to customer values.

This study describes the research procedure based on the organization of QFD based on the concept of Yan and Ma [35]. The fuzzy linguistic preference relation is adopted to evaluate the weights of multiattributes in the deployment process. In this way, respondents' subjective judgments of multiple properties of customer benefits are more clearly expressed.

2.1 The flow of QFD model

There are five steps in building the flow of the QFD procedure as follows: (1) appropriately developing the hierarchy of customer benefits through literature reviews and experts interviews, (2) evaluating the weight and performance of each customer benefit using fuzzy linguistic preference relations, (3) obtaining the customer loyalty programs through experts' interview, (4) expert evaluation of the fuzzy association matrix between the customer benefits and the customer

loyalty programs, and (5) carefully assessing the final performance evaluation of the customer loyalty programs. The flow of the QFD model is shown in Figure 1.

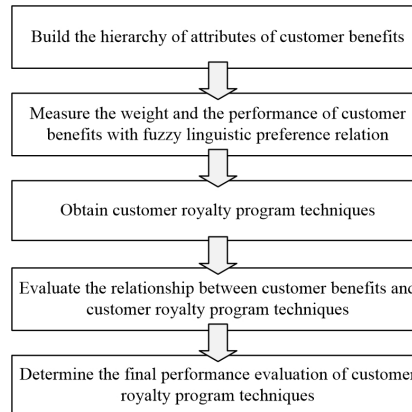


Figure 1: The flow chart for the algorithm in this study.

2.2 Establish and assess the attributes of the customer benefits

Step 1: Build the hierarchical structure of customer benefits

In the QFD process, the first step is to select the input factors of the customer benefits, which is called the voice of the customer. This study established the hierarchal structure of the attributes of customer benefits through a literature review and divided them into utilitarian benefits, hedonic benefits and symbolic benefits based on the research of Mimouni-Chaabane and Voll [19]. In addition, interviews with professional management staff members were performed in order for the staff to provide the details of the customer benefits program that comply with the suitable hierarchal structure in the shopping mall (See Table 1). Thus, the questionnaire was also developed and corrected through e-mail and telephone contact with the abovementioned professional experts and their suggestions.

Table 1: Dimensions and attributes of customer benefits in the shopping center

Goal	Dimensions	Attributes	Descriptions and literatures
Customer benefits	Utilitarian benefits	Time convenience	Reducing customers' extra waiting time (such as waiting for parking and exchanging premiums coupons and trading stamps) and obtain better convenience [31]
		Monetary savings	Saving money (favorable commodity prices and discounts) and obtaining economic savings in the shopping process [9, 10]
		Applicability	Providing useful and practical gifts and services to customers in the shopping process [3]
	Hedonic benefits	Exploration	Customers trying novel activities in the participation process [1, 7]
		Entertainment	Experiencing funny, interesting and fascinating activities (such as a big balloon parade, an outdoor cinema, a picnic and a race) [23]
	Symbolic benefits	Preferential treatment	Providing preferential services that allow customers to enjoy special identities and superior feelings [19]
		Special Services	Providing special services or care (such as a lounge service for special service members) that allow customers to experience friendly treats [34, 38]
		Community cohesion	Producing cohesive interaction and emotional links among customers for the same purpose or intention [6]

Step 2: Measuring the weights and performances of customer benefits using fuzzy linguistic preference relations www.SID.ir

This study adopts the fuzzy linguistic preferences that were proposed by Wang and Chen [28, 29] in order to obtain the weights of the attributes of customer benefits. Through the combination of concepts with fuzzy linguistic and preference relations, we constructed the consistency fuzzy preference relation matrix that simplifies the complex computing process of the relation matrix and improves the inconsistencies.

(1) Fuzzy set theory

Fuzzy set theory was developed by Zadeh [36] to resemble human reasoning and the uncertainty of human thoughts in its use of approximate information. It was specifically designed to mathematically represent uncertainty and vagueness and provide formalized tools for dealing with the intrinsic imprecision of human problems [2, 32]. Because linguistic variables are not directly mathematically operable, each linguistic variable can be associated with a fuzzy number characterizing the meaning of the generic verbal term. Conversion scales are applied to transform linguistic terms into fuzzy numbers. Determining the number of conversion scales is generally intuitive [4].

The triangular fuzzy number of membership function $\tilde{M}(x)$ of fuzzy set $\tilde{M} = (l, m, u)$ in universe X is defined as follows [4]:

$$\tilde{M}(x) = \begin{cases} \frac{x}{m-l} - \frac{l}{m-u}, & x \in [l, m], \\ \frac{m-x}{m-u} - \frac{m-l}{m-u}, & x \in [m, u], \\ 0, & \text{otherwise.} \end{cases}$$

where $l \leq m \leq u$, m is the most possible value of the fuzzy number \tilde{M} , and l and u are the lower and upper bounds, respectively. According to Zadeh's extension principle, given two triangular fuzzy numbers $\tilde{M}_1 = (l_1, m_1, u_1)$ and $\tilde{M}_2 = (l_2, m_2, u_2)$, (l_1 and $l_2 \geq 0$).

a. The extended addition is defined as

$$\tilde{M}_1 \oplus \tilde{M}_2 = (l_1 + l_2, m_1 + m_2, u_1 + u_2).$$

b. The extended multiplication is defined as

$$\tilde{M}_1 \otimes \tilde{M}_2 \approx (l_1 \cdot l_2, m_1 \cdot m_2, u_1 \cdot u_2).$$

c. The inverse of the triangular fuzzy number $\tilde{M}_1 = (l_1, m_1, u_1)$ is defined as $\tilde{M}_1^{-1} = (\frac{1}{u_1}, \frac{1}{m_1}, \frac{1}{l_1})$.

(2) Fuzzy linguistic variables

Linguistic variables refer to the variables that regard the human vocabulary of natural language as variables [37], such as "equally important," "somewhat important," "important," "quite important," "very important" and other words, which describe the importance degree of various criteria. When respondents' evaluations can be represented by linguistic variables, their subjective judgments can be expressed easier and clearer. In addition, the ambiguity of the evaluated process could also be fully expressed in order to enhance the feasibility and acceptance of the analysis results [22, 25]. Generally, linguistic variables contain triangular fuzzy numbers, trapezoid fuzzy numbers and S-shaped fuzzy numbers, and the most widely used are triangular fuzzy numbers. To solve the imprecision of subjective assessments using the qualitative information of respondents, this study adopts the concept of the fuzzy linguistic scale used by Tolga et al [26] in order to improve the traditional Likert Scale. Nine linguistic terms that were parameterized by real numbers are used to indicate the importance weights of customer benefits as follows: equally important, somewhat important, important, quite important, and very important.

(3) Using fuzzy preference relations for weighting customer benefits

In traditional pairwise comparison methodologies, respondents always provide $n(n-1)/2$ judgments for a preference matrix which has n elements. To simplify the comparisons, this study used fuzzy preference relations presented by Wang and Chen [28, 29] because they provide a complete preference relation matrix that has n elements with the least $(n-1)$ judgments. The procedures used to weight the importance of customer benefits on the basis of fuzzy preference relations are as follows.

a. Construct pairwise comparison matrices among the customer benefits (B_i , $i = 1, 2, \dots, n$). Ask respondents which is the most important element in each pair of adjacent elements in a set of $(n-1)$ fuzzy preference values

Archive of SID

$\{\tilde{a}_{12}, \tilde{a}_{23}, \dots, \tilde{a}_{(n-1)n}\}$. For example,

$$D^k = \begin{matrix} & B_1 & B_2 & B_3 & \cdots & B_n \\ \begin{matrix} B_1 \\ B_2 \\ B_3 \\ \vdots \\ B_n \end{matrix} & \begin{pmatrix} 1 & \tilde{a}_{12} & \times & \times & \times \\ \times & 1 & \tilde{a}_{23} & \times & \times \\ \times & \times & 1 & \tilde{a}_{34} & \times \\ \vdots & \vdots & \vdots & \ddots & \tilde{a}_{(n-1)n} \\ \times & \times & \times & \times & 1 \end{pmatrix} \end{matrix}$$

where \tilde{a}_{ij} denotes the intensity of fuzzy preference for customer benefits i and j assessed by k th respondent, $\tilde{a}_{ij} = \tilde{1}$ is the indifference between benefit i and benefit j , and $\tilde{a}_{ij} = \tilde{3}, \tilde{5}, \tilde{7}, \tilde{9}$ indicates that benefit i is relatively more important than benefit j whereas $\tilde{a}_{ij} = \tilde{3}^{-1}, \tilde{5}^{-1}, \tilde{7}^{-1}, \tilde{9}^{-1}$ indicates that benefit i is less important than benefit j . The sign “ \times ” indicates the remaining \tilde{a}_{ij} , which can be done by fuzzy positive reciprocal matrix if and only if $\tilde{a}_{ji} = \tilde{a}_{ij}^{-1}$.

b. Transform the preference value $\tilde{a}_{ij} \in [1/9, 9]$ into $\tilde{P} = (\tilde{p}_{ij})$ with $\tilde{p}_{ij} \in [0, 1]$, and then obtain the remaining p_{ij} by using the additive transitivity property as follows:

$$D^k = \begin{matrix} & B_1 & B_2 & B_3 & \cdots & B_n \\ \begin{matrix} B_1 \\ B_2 \\ B_3 \\ \vdots \\ B_n \end{matrix} & \begin{pmatrix} 1, 1, 1 & p_{12}^L, p_{12}^M, p_{12}^R & \times & \times & \times \\ 1-p_{12}^L, 1-p_{12}^M, 1-p_{12}^R & 1, 1, 1 & p_{23}^L, p_{23}^M, p_{23}^R & \times & \times \\ \times & 1-p_{23}^L, 1-p_{23}^M, 1-p_{23}^R & 1, 1, 1 & p_{34}^L, p_{34}^M, p_{34}^R & \times \\ \vdots & \vdots & \vdots & \ddots & p_{(n-1)n}^L, p_{(n-1)n}^M, p_{(n-1)n}^R \\ \times & \times & \times & 1-p_{(n-1)n}^L, 1-p_{(n-1)n}^M, 1-p_{(n-1)n}^R & 1, 1, 1 \end{pmatrix} \end{matrix}$$

For a reciprocal fuzzy linguistic preference relation $\tilde{P} = (\tilde{p}_{ij}) = (p_{ij}^L, p_{ij}^M, p_{ij}^R)$ to be consistent, it must verify additive consistency, the following statements must be true [28, 29]:

$$p_{ij}^L + p_{jk}^L + p_{ki}^R = \frac{3}{2} \quad \forall i < j < k, \tag{1}$$

$$p_{ij}^M + p_{jk}^M + p_{ki}^M = \frac{3}{2} \quad \forall i < j < k, \tag{2}$$

$$p_{ij}^R + p_{jk}^R + p_{ki}^L = \frac{3}{2} \quad \forall i < j < k, \tag{3}$$

$$p_{i(i+1)}^L + p_{(i+1)(i+2)}^L + \cdots + p_{(j-1)j}^L + p_{ji}^R = \frac{j-i+T}{2} \quad \forall i < j, \tag{4}$$

$$p_{i(i+1)}^M + p_{(i+1)(i+2)}^M + \cdots + p_{(j-1)j}^M + p_{ji}^M = \frac{j-i+1}{2} \quad \forall i < j, \tag{5}$$

$$p_{i(i+1)}^R + p_{(i+1)(i+2)}^R + \cdots + p_{(j-1)j}^R + p_{ji}^L = \frac{j-i+1}{2} \quad \forall i < j. \tag{6}$$

c. If the value of some elements of the aggregated matrices do not have a value between zero and one $\tilde{p}_{ij} \notin [0, 1]$ after calculating the pairwise comparisons, the following transformations should be applied to transform the elements to the interval $[0, 1]$, i.e. $f : [-c, 1 + c] \rightarrow [0, 1]$ where c is the maximum amount of violation from interval $[0, 1]$ among elements of \tilde{P} .

$$f(x^L) = \frac{x^L + c}{1 + 2c} \tag{7}$$

$$f(x^M) = \frac{x^M + c}{1 + 2c} \tag{8}$$

$$f(x^R) = \frac{x^R + c}{1 + 2c} \tag{9}$$

d. Calculate the weights of the elements as equation (10):

$$\tilde{w}_i = \frac{\tilde{g}_i}{\tilde{g}_1 \oplus \tilde{g}_2 \oplus \cdots \oplus \tilde{g}_n}, \tag{10}$$

Through the preference value transformed from \tilde{a}_{ij} into $\tilde{P} = (\tilde{p}_{ij})$, it is easy to calculate \tilde{g}_i which shows the mean of the comparison values of each customer benefit i . \tilde{g}_i is calculated as equation (11):

$$\tilde{g}_i = \frac{1}{n} [\tilde{p}_{i1} \oplus \tilde{p}_{i2} \oplus \dots \oplus \tilde{p}_{in}], \quad i = 1, 2, \dots, n \quad (11)$$

Using a defuzzification method, like fuzzy mean, the final defuzzified weights are calculated as equation (12):

$$w_i = \frac{w_i^L + w_i^M + w_i^R}{3} \quad (12)$$

There are many operators and methods that can be used as well to calculate the weight of the elements and to defuzzify them (please refer to Liu and Jin [15] for other operators and refer to Broekhoven and Baets [5] for the defuzzification methods).

2.3 Relationship analysis between customer benefits and customer loyalty programs

Step 3: Obtain technical details of the customer loyalty programs

This study divided customer loyalty programs into two different types of technical projects, namely, monetary and special types. Suppose that there are T_i technical project compliance items ($i = 1, 2, \dots, k$) that are determined from the in-depth interviews with the case mall's managers. They established eight relevant features of customer loyalty programs that are related to the technical analysis. For the evaluation, the ones that are closer to professional managers' suggestions have been selected, as detailed in the following list.

Exclusive Promotional Activities. The shopping center can send VVIP and VIP customers an exclusive promotional activity invitation letter every month. This allows them to enjoy exclusive promotions such as free trial samples, buy one get one free deals at authorized stores and exclusive discounts by showing the invitation letter.

Exclusive Promotion Gift. The shopping can offer VVIP and VIP customers promotional gifts such as birthday gifts, exclusive anniversary gifts, festival gifts and exclusive member gifts.

VIP Lounge Service. The shopping center can give VVIP and VIP customers honorable and special treatments by bringing in specific companies or allowing them to stay comfortably in an exquisite leisure space with kind service people that provide free afternoon tea, a light meal, and the newest popular magazines and newspapers.

Exclusive Parking Zone. The shopping center can provide VVIP and VIP customers an exclusive parking zone. Therefore, they will not be as affected by the crowds and traffic during holidays, promotions and festivals because they can directly go to the exclusive parking zone for parking and do not need to wait for parking as other customers may.

Exclusive Service Zone for Promotional Schedule. During each major promotional activity, the customer service center will set up an additional exclusive service zone to provide VVIP and VIP customers with preferred redemption service, and they do not need to wait in line for this service as other customers may.

Special Invitation Activities. The shopping center can regularly hold different activities such as special exhibitions and seminars for VVIP and VIP customers and give them special treatment, such as priority in activities such as Professional Valuable Appraisals, Balloon Parades and New Year's Eve parties.

Newest Information Transmission. The shopping center can send promotional materials, such as scheduled and exclusive activities, to VVIP and VIP members through DM, mail, emails, and text so that they can quickly receive the newest promotional information.

Communication Service Specialist. The shopping center can supply VVIP and VIP customers with an exclusive communication service specialist to respond their problems and collect and understand individual customers' personalities, preferences and habits.

Step 4: Assessment of the relationship between customer benefits and customer loyalty programs

The respondents were asked to assign a value between 0–5 that reflects the impact of each customer benefit (hows) on each customer loyalty program (whats). Then, the results were translated into linguistic variables and averaged. To quantify the linguistic variables, triangular fuzzy numbers have been used and the results that are obtained from each respondent have been aggregated using equation (13):

$$\tilde{r}_{ij} = \frac{1}{n} (\tilde{r}_{ij1}, \tilde{r}_{ij2}, \dots, \tilde{r}_{ijn}), \quad i = 1, 2, \dots, k; j = 1, 2, \dots, m. \quad (13)$$

where k is the number of “whats”, m is number the of “hows” and n is the number of respondents.

The rating is the score matrix between “how”–“what” in which the element \tilde{r}_{ij} , which is a triangular fuzzy number that is defined by $\tilde{r}_{ij} = (r_{ij\alpha}, r_{ij\beta}, r_{ij\gamma})$, represents the aggregated score between the i -th “what” and the j -th “how”.

Step 5: Calculate the weights of customer loyalty programs

The fuzzy importance weight of each customer loyalty program that completes the HOQ can be calculated using equation (14):

$$\widetilde{W}_{HOW_s} = \frac{1}{k} [(\widetilde{r}_{j1} \otimes w_1) \oplus (\widetilde{r}_{j2} \otimes w_2) \oplus \dots \oplus (\widetilde{r}_{jk} \otimes w_k)], \quad j = 1, 2, \dots, m. \quad (14)$$

Equation (14) provides the calculation of the weights of the customer loyalty programs in the final step of the HOQ. \widetilde{r}_{ij} represents the aggregated score between the i -th “customer benefit” and the j -th “customer loyalty program” and w_i is the defuzzified weights of each customer benefit from equation (12). In this way, we can obtain the final weights of customer loyalty programs using a defuzzification method.

3 Data analyses and results

3.1 Research object

According to previous literature reviews and expert opinions, this study determined the customer benefit levels and used a questionnaire as the measurement instrument to conduct the survey. This section employed loyal customers who hold VVIP and VIP memberships of a shopping center as the questionnaire distribution objects in order to obtain each weight assessment of customer benefits. The official questionnaire was distributed between April 14th, 2016 and April 30th, 2016. The distribution locations were at the VVIP and VIP customer service centers, the VVIP and VIP exclusive parking zones, and the entrance and exit of the center. In total, 60 questionnaires were distributed, and 60 valid copies were collected.

In the section regarding customer benefits and the customer loyalty program’s correlation assessment, the professional management personnel in the business department at the shopping center were invited to participate as questionnaire distribution objects in order to acquire the correlations between customer benefit attributes and loyalty program items. Official questionnaires were distributed to the professional management personnel at the shopping center between May 20th, 2016 and June 10th, 2016.

Due to the internal management concerns of the shopping center, the study assigned personnel to distribute the questionnaires and provided an explanation of how to answer the questionnaire before the official questionnaire was distributed. If questionnaire respondents had any further questions regarding the contents, they could call the study organizers in order to receive an answer. In total, 40 questionnaires were distributed. Excluding 4 questionnaires that were incomplete, there were 36 valid questionnaires.

3.2 The relative weight analysis of customer benefits

(1) The evaluation of customer benefits with the fuzzy linguistic preference relation matrix

Using the fuzzy linguistic computations from equation (1) to equation (10), the study evaluated the pair-comparison matrix that corresponded to the special customer groups (i.e., VVIP and VIP). Then, the study utilized equation (11) to integrate the interviewer’s opinions of each group (i.e., to acquire the mean) to obtain the fuzzy means of the customer benefit dimensions from two groups and to build a complete fuzzy linguistic preference relation matrix of customer benefits.

Furthermore, the study employed the abovementioned dimensions of customer benefits with the same computational process and followed the order in order to individually assess each attribute item with respect to utilitarian benefits, hedonic benefits, and symbolic benefits under the customer benefit dimensions and to build the fuzzy linguistic preference relation matrix of customer benefits for special customer groups.

(2) Importance assessment of customer benefits

To acquire the fuzzy weight value of each customer benefit item, next, the study defuzzified the triangular fuzzy number using equation (12) in order to obtain the defuzzified weight value. Figure 2 denotes that the triangle areas of hedonic benefits and symbolic benefits are bigger, which means that customer groups have larger differences of opinion and perception for both benefit items. However, the area of utilitarian benefits is smaller, which signals that customer groups are more uniform with respect to their opinions and perceptions. In addition, the overall location of utilitarian benefits is more skewed to the right side (bigger score) than the other two dimensions, which shows that the customer groups emphasize this dimension more. This is because the group belongs to high loyalty customers, and they have higher familiarity with the consumption environment of the shopping center. Therefore, they unanimously assigned utilitarian benefits higher importance. Additionally, from Figure 2, the index points of each indicate that the order

of customer groups' importance for each dimension is utilitarian benefits, hedonic benefits, and symbolic benefits, respectively.

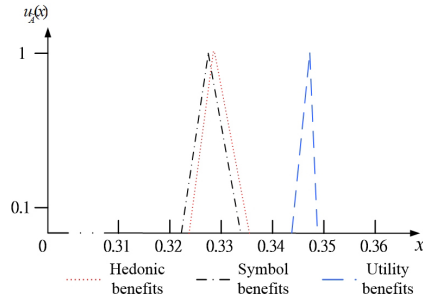


Figure 2: The membership function of customer benefits.

According to analysis results in the last column of Table 2, the order of the first four items of the final weight scores of customer groups' attributes, from high to low, is entertainment (the final weight score is 0.169), exploration (the final weight score is 0.159), time convenience (the final weight score is 0.131), and priority treatment (the final weight score is 0.120).

Table 2: A complete HOQ structure of customer loyalty programs

Customer benefits		Customer loyalty programs								Relative weights
		Monetary loyalty programs		Special loyalty programs						
Dimensions	Attributes	Exclusive Promotional Activity	Exclusive Promotional Gift	VIP Lounge Service	Exclusive Parking Zone Service	Exclusive Service Zone for Promotional Schedule	Special Invitation Activity	Newest Information Transmissions	Communication Service Specialists	
Utility benefits	Time convenience	2.25 / 0.29	2.44 / 0.32	4.67 / 0.61	6.67 / 0.87	6.22 / 0.81	4.31 / 0.56	2.97 / 0.39	2.81 / 0.37	0.131
	Economic savings	6.00 / 0.65	5.78 / 0.63	5.00 / 0.54	5.50 / 0.60	3.86 / 0.42	2.86 / 0.31	3.50 / 0.38	1.86 / 0.20	0.107
	Applicability	6.11 / 0.66	5.72 / 0.61	5.28 / 0.57	6.03 / 0.65	5.61 / 0.60	3.50 / 0.38	4.94 / 0.53	3.81 / 0.41	0.107
Hedonic benefits	Exploration	3.67 / 0.58	2.03 / 0.32	2.06 / 0.32	1.81 / 0.28	1.25 / 0.20	4.22 / 0.69	2.75 / 0.43	2.53 / 0.40	0.159
	Entertainment	3.69 / 0.62	2.81 / 0.47	3.86 / 0.65	1.81 / 0.30	1.28 / 0.22	4.67 / 0.79	3.50 / 0.59	1.53 / 0.26	0.169
Symbol benefits	Preferential treatment	5.25 / 0.65	3.83 / 0.47	6.67 / 0.82	6.17 / 0.76	6.17 / 0.76	5.89 / 0.72	3.94 / 0.48	5.50 / 0.68	0.120
	Special Services	5.33 / 0.59	4.89 / 0.54	6.44 / 0.72	6.11 / 0.68	6.22 / 0.69	6.28 / 0.70	4.94 / 0.55	5.94 / 0.66	0.111
	Community cohesion	1.72 / 0.16	2.36 / 0.22	4.17 / 0.39	2.86 / 0.27	2.31 / 0.21	2.83 / 0.36	2.25 / 0.21	2.47 / 0.23	0.095
Customer loyalty programs	Initial weights	4.20	3.59	4.56	4.52	3.91	4.51	3.57	3.20	
	Relative weights	0.1311	0.112	0.1422	0.141	0.122	0.1407	0.1113	0.0998	
The performance and improvement rate	Current performance	3.333	3.278	4.167	4.139	4.028	3.750	3.472	3.389	
	Expected performance	3.972	3.971	4.333	4.25	4.139	4.194	4.25	4.056	
	Ratio of improvement	1.192	1.195	1.040	1.027	1.028	1.119	1.224	1.197	
	Performance	0.437	0.367	0.592	0.584	0.491	0.528	0.386	0.388	

In terms of customer benefits, the analysis indicates that utilitarian benefits receive the highest score among the

weight scores of the three dimensions of utilitarian benefits, hedonic benefits and symbolic benefits. Its weight score is 0.345. Under the utilitarian benefit dimension, there are three attributes, including time convenience, monetary savings and usefulness. Time convenience receives the highest weight score. Its weight score is 0.378. Under the hedonic benefit dimension, the weight score of entertainment is 0.516 higher than the exploration weight score. Lastly, under the symbolic benefit dimension, there are three attributes, including priority treatment, special service and group cohesiveness. Priority treatment has the highest weight score of 0.367.

3.3 The relationship analysis between customer benefits and customer loyalty programs

The study gave the professional management personnel of the case shopping center the opportunity to evaluate the relationship level of eight customer benefit attribute items and eight acquired customer loyalty program items by adopting the method of Chowdhury and Quaddus [3] in order to reflect the relationships and transfer them into a reflective fuzzy number. Then, the study integrates 36 sets of relation matrices (i.e., to acquire the mean) in order to obtain a complete fuzzy relation matrix of the attributes of the customer benefit and loyalty programs. Further, the fuzzy linguistic terms are fuzzified using equation (13) in order to acquire the relation matrix (the value of the upper-left corner of Table 2), and the weight scores of the overall customer benefits are multiplied by the value of the upper-left corner using equation (14) in order to gain the relationship value (the value of the lower-right corner of Table 2) of the customer benefit and customer loyalty program attributes.

The relationship matrix in Table 2 shows that the item of exclusive promotional activity has the highest relationship value with the usefulness of customer benefits. The relationship value is 0.66. The item of exclusive free gift promotion has the highest relationship level with the customer benefit of monetary savings. The relationship value is 0.63.

3.4 The relative weight assessment of customer loyalty programs

This study used the value of the lower-right corner in Table 2 to acquire the initial weight scores of loyalty programs; then, the weights were standardized to obtain the criticality of the relative weight value of customer loyalty programs.

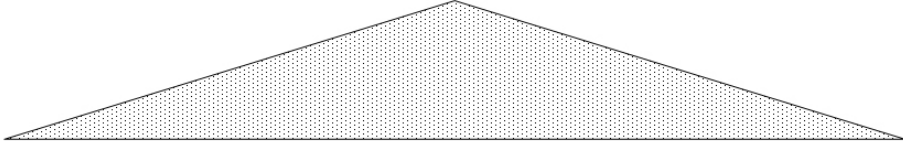
In addition, the study employed a range from 1 to 5 points as the assessment score scale in order to measure professional management personnel's current and expected performance regarding the execution of the shopping center's loyalty program. A higher assessment score means that the professional management personnel gave a higher score to the technique's performance. First, the study consolidated 36 interviewers' assessment scores for each loyalty program technique in order to acquire the overall performance value and improvement rate of each loyalty program technique, as determined by the professional management personnel of the shopping center.

Finally, the study applied traditional QFD to further compare the differences between the traditional and proposed fuzzy QFD applications. The results are as shown in Figure 3. The proposed fuzzy QFD ratings result in the same ranking order for the relative weights of the attributes of customer benefits as those that were obtained using traditional QFD. In addition, it can be generally expected that the final importance ratings of the customer loyalty programs using traditional and proposed fuzzy QFD will exhibit the same trend. Using both the traditional and proposed fuzzy QFD to measure the final importance ratings of the customer loyalty programs ensures that the ratings are as similar as possible. This also ensures the reliability and validity of the proposed model in this study.

Figure 3 indicates that although the traditional and proposed fuzzy QFD ratings result in the same ranking order of customer benefits, the traditional QFD ratings tend to be closer to the upper limits of the corresponding proposed fuzzy QFD and further from the lower limits. It also shows that the value in the traditional QFD model is overestimated by the numerical analysis. With regard to the importance priority order for customer loyalty programs, no major differences were found between the highest and lowest importance priorities. However, for the benefits "Exclusive Promotional Gift," "Exclusive Service Zone for the Promotional Schedule," and "Newest Information Transmission," the order of these three techniques is slightly different in the frameworks of the traditional and new fuzzy QFD models. Comparing the two QFD models, the proposed fuzzy QFD model may be more accurate and effectively exclude the overestimated values.

3.5 The analysis of the advantages and weaknesses analysis of customer benefit and customer loyalty programs

Through the previously mentioned performance analysis and the addition of the relationship matrix of customer benefit and customer loyalty programs in Table 2, the study assesses the advantages and weaknesses of the shopping center's programs.



Customer benefits		Customer loyalty programs								Relative weights (Fuzzy QFD)	Relative weights (Traditional QFD)						
		Monetary loyalty programs		Special loyalty programs													
Dimensions	Attributes	Exclusive Promotion Activity	Exclusive Promotion Gift	VIP Lounge Service	Exclusive Parking Zone Service	Exclusive Service Zone for Promotional Schedule	Special Invitation Activity	Newest Information Transmission	Communication Service Specialist								
Utility benefits	Time convenience									0.131	0.143						
	Economic savings									0.107	0.097						
	Applicability									0.107	0.096						
Hedonic benefits	Exploration									0.159	0.163						
	Entertainment									0.169	0.179						
Symbol benefits	Preferential treatment									0.120	0.128						
	Special Services									0.111	0.103						
	Community cohesion									0.095	0.091						
Customer loyalty programs	Final importance ratings (Fuzzy QFD)									0.1311	0.1120	0.1422	0.1410	0.1220	0.1407	0.1113	0.0998
	Rankings									4	6	1	2	5	3	7	8
	Final importance ratings (Traditional QFD)	0.1321	0.129	0.1438	0.1422	0.1011	0.1418	0.1117	0.0983								
	Rankings	4	5	1	2	7	3	6	8								

Figure 3: The difference in the ratings of the traditional and fuzzy QFD.

(1) To promote the advantage of customer benefits

According to Table 3, the first three items that have higher scores on the performance assessment of the customer benefits of the shopping center are “Entertainment,” “Time convenience,” and “Priority treatment”. Moreover, it can be observed that customer loyalty programs have the highest relationship level with “Special event invitations,” “Exclusive parking zone service” and “VIP lounge service”.

From the above, we can realize that the loyalty programs that are provided by the shopping center meet the customer benefit requirements and receive a quite good evaluation. Thus, it is suggested that the shopping center should regularly use special invitations in order to create more plentiful entertainment programs and, in the meantime, implement exclusive parking zone services in order to satisfy customers’ time convenience requirements. The center also needs to intensify the overall service of the VIP lounge in order to fulfill customers’ priority treatment requirements. The above suggestions can act as directions that can be taken by the shopping center in order to effectively maintain its advantages.

(2) To improve weaknesses of customer benefits

According to Table 4, the first three items for the improvement of customer benefits are “Exploration,” “Special service,” and “Usefulness”. Through the lower-right corner of the correlation matrix, it can separately found that “Special activity invitations,” “VIP lounge service” and “Exclusive promotions” are loyalty programs with higher relationship levels.

In the improvement of exploration, this study suggests that one should emphasize the operation of special activity invitations by aggressively increasing the variety of activities and experiences in order to satisfy the customer benefit requirements for exploration. In addition, in the improvement of usefulness, one can utilize exclusive activity promotions.

Table 3: The initial weights and relative weights of customer loyalty programs

Customer loyalty programs		Initial weights	Relative weights	Rankings
Monetary loyalty programs	Exclusive Promotion Activity	4.20	0.1311	1
	Exclusive Promotion Gift	3.59	0.1120	2
Special loyalty programs	VIP Lounge Service	4.56	0.1422	1
	Exclusive Parking Zone Service	4.52	0.1410	2
	Exclusive Service Zone for Promotional Schedule	3.91	0.1220	4
	Special Invitation Activity	4.51	0.1407	3
	Newest Information Transmission	3.57	0.1113	5
	Communication Service Specialist	3.20	0.0998	6

Table 4: The overall performance and improvement rate of each customer loyalty program

Customer loyalty programs	Weights	Current performance	Expected performance	Ratio of improvement
Exclusive Promotion Activity	0.1311	3.333	3.972	1.192
Exclusive Promotion Gift	0.1120	3.278	3.971	1.195
VIP Lounge Service	0.1422	4.167	4.333	1.040
Exclusive Parking Zone Service	0.1410	4.139	4.250	1.027
Exclusive Service Zone for Promotional Schedule	0.1220	4.028	4.139	1.028
Special Invitation Activity	0.1407	3.750	4.194	1.119
Newest Information Transmission	0.1113	3.472	4.250	1.224
Communication Service Specialist	0.0998	3.389	4.056	1.197

Exclusive promotions should avoid repetitive and low usage value contents and can follow customers' previous purchase habits in order to design contents that meet the customer benefit requirements for usefulness. Lastly, in the improvement of special services, one should examine the current operations of the VIP lounge and improve the provisions of special services. The suggestions mentioned above can act as directions for effectively improving the weaknesses.

(3) To aggressively improve weak techniques

According to Table 5, the first three items for the improvement of the shopping center's customer loyalty programs are "Newest information transmissions," "Communication service specialists," and "Exclusive free gift promotions".

Through the value of the lower-right corner of the relationship matrix, we can learn that the major attributes that influence customer benefits are "Entertainment," "Preferential treatment" and "Momentary savings". The newest information transmission will influence entertainment, and the technique that has the highest relationship with entertainment is special activity invitations. Thus, this study suggests that the shopping center should use special activity invitations and mutually supplement these two loyalty programs in order to reduce the impacts of entertainment. With respect to the impact of communication service specialists on priority treatment, this study suggests that one should coordinate with the VIP lounge in order to improve the effects of priority treatment. With respect to the effect of exclusive free gift promotions on monetary savings, this study suggests that it should coordinate with exclusive activity promotions in order to improve the impact of monetary savings.

Table 5: The analysis of promoting the advantage of customer benefits

Attributes of customer benefits	Customer loyalty programs		
	Special event invitation	Exclusive parking zone service	VIP lounge service
Entertainment	4.67 / 0.79		
Time convenience		6.67 / 0.87	
Preferential treatment			6.67 / 0.82
Performance of Customer loyalty programs	0.528	0.584	0.592

Table 6: The analysis of improving weaknesses of customer benefits

Attributes of customer benefits	Customer loyalty programs			The improvement rate of customer benefits
	Special event invitation	VIP lounge service	Exclusive promotion	
Exploration	4.42 / 0.69			1.257
Special service		6.44 / 0.72		1.171
Usefulness			6.11 / 0.66	1.160

Table 7: The analysis of improving weak technology ability

Attributes of customer benefits	Customer loyalty programs		
	Newest information transmission	Communication service specialist	Exclusive free gift promotion
Entertainment	3.50 / 0.59		
Preferential treatment		5.50 / 0.68	
Monetary savings			5.78 / 0.63
The improvement rate of customer loyalty programs	1.224	1.197	1.195

4 Conclusion remarks

4.1 Conclusions

Currently, the competition in the marketplace is becoming aggressive. Businesses all make their best efforts to keep critical, loyal customers and promote their competitive abilities. In view of this, this study applied the QFD method to build the assessment structure for shopping centers in order to evaluate their strategies and transform their customer members' benefit requirements into customer loyalty programs to effectively promote their competitive advantages. In addition, the combined application of the fuzzy linguistic preference relation approach can allow for the proper measurement of multi-item semantic data during research and effectively solve problems, such as semantic fallacies and inaccuracies, that often happen with traditional measurement methods. Therefore, the QFD method can generate more accurate data for measuring abstract customer benefits and further understanding the customer benefit requirements between different customer groups. Through empirical research, this study applied the QFD method in order to explore customer members' benefit requirements and shopping centers' customer loyalty programs. In summary, the proposed approach can be valuable for the theory and also for practitioners. First, it allows for the integration of the customer benefits and the customer loyalty programs and considers the VIP customers that are involved in the offer. In addition, the evaluation of requirements performed by using fuzzy linguistic preference relations allows for the prioritization of the customer loyalty programs, even when considering the uncertainty and vagueness that occur with respect to exact judgments.

The study used shopping centers as the empirical research target, and the results showed the following. (1) The VVIP customer group and VIP customer group assign different importance to customer benefits. In terms of the dimensions, the VVIP customer group's importance order is utilitarian benefits, symbolic benefits and hedonic benefits, while the order for the VIP customer group is utilitarian benefits, hedonic benefits and symbolic benefits. In terms of the attributes of each dimension, the importance order of the two groups is the same. Those are time convenience, priority treatment, and entertainment, respectively. (2) To provide customer benefits that meet customer expectations, with respect to time convenience, priority treatment, and entertainment, the management staff of shopping centers should intensify their critical techniques such as special event invitations, exclusive parking zone service, and VIP lounge service. (3) From the perspective of the reinforcement of customer benefit weaknesses, for exploration, usefulness, and special service, shopping center management can further propose improved or enhanced techniques for special event invitations, exclusive promotional activities, and VIP lounge service.

4.2 Management implications and suggestions

There are five management implications that are suggested by the research results, and they are provided as follows.

(1) To effectively develop new customer loyalty program techniques

This study used the QFD method to analyze customers and customer loyalty programs, which can provide a major critical element to form channels and become a basis to fulfill customer requirements. Thus, the research results allow one to effectively develop new customer loyalty programs and promote the efficiency of the overall development process in order to quickly cope with market changes by developing new services.

(2) To provide differentiated customer loyalty programs

Due to the differences in each customer's requirements, each customer will be concerned with different benefits. Thus, during the developmental process of shopping centers' customer loyalty programs, the management staff should analyze and understand the different customer groups in order to provide differentiated customer loyalty programs that will satisfy customers' multiple requirements and better maximize the service quality of the shopping centers.

(3) To develop customer loyalty programs with representativeness

Shopping centers obtain higher assessments for certain specific customer benefits, which imply that their customers agree with their development in this respect. Therefore, shopping center management can make their best efforts to apply their resources and abilities to these certain specific customer benefits. When they provide customer loyalty programs, they should use these benefits as a major point in order to boost customers' acceptance so that they can further become unique representatives of the shopping centers.

(4) To comprehend the strengths of the different techniques

The managers of shopping centers should comprehend the relatively stronger techniques and continue maintaining their strong techniques in order to intensify the impeccable positions of their customer loyalty programs. For example, they must make the best use of their more advantageous program items such as their VIP lounge service. Although the item has been popularly adopted by most competitors, the shopping centers can utilize the priority treatment of customer benefits to customers during practical operations in order to obtain the highest performance assessment from customers. Thus, this can be used as a basis of a competitive advantage.

(5) To use weak techniques to heighten a business's relative competitive advantages

In addition to comprehending their strongest techniques, their worse techniques also must be improved in order to increase their relative competitive advantages. Hence, shopping center managers can use their weak techniques in the current stage as niches to intensify their techniques and to apply and improve these lacking techniques in order to reinforce their relative competitive advantages. Moreover, this item has a very high connection with entertainment in customer benefits. Thus, shopping center managers should enhance their newest information transmission technology to elevate the enterprises' abilities and improve over their competitors, thereby increasing their relative competitive advantages.

References

- [1] N. Bahri-Ammari, *The effects of loyalty program quality on word-of-mouth recommendations intentions*, World Academy of Science, Engineering and Technology, **64**(2) (2012), 1002–1011.
- [2] S. Ballı, S. Korukoğlu, *Development of a fuzzy decision support framework for complex multi-attribute decision problems: A case study for the selection of skillful basketball players*, Expert Systems, **31**(1) (2014), 56–69.
- [3] T. Brashear-Alejandro, J. Kang, M. D. Groza, *Leveraging loyalty programs to build customer–company identification*, Journal of Business Research, **69** (2016), 1190–1198.
- [4] E. Briggs, D. Grisaffe, *Service performance-loyalty intentions link in a business-to-business context: The role of relational exchange outcomes and customer characteristics*, Journal of Service Research, **13**(1) (2010), 37–51.
- [5] E. V. Broekhoven, B. D. Baets, *Fast and accurate center of gravity defuzzification of fuzzy system outputs defined on trapezoidal fuzzy partitions*, Fuzzy Sets and Systems, **157** (2006), 904–918.
- [6] I. Cabras, M. P. Mount, *How third places foster and shape community cohesion, economic development and social capital: The case of pubs in rural Ireland*, Journal of Rural Studies, **55** (2017), 71–82.
- [7] R. Chitturi, R. Raghunathan, V. Mahajan, *Delight by design: The role of hedonic versus utilitarian benefits*, Journal of Marketing, **72**(3) (2008), 48–63.
- [8] Department of Statistics, the Ministry of Economic Affairs, http://www.moea.gov.tw/MNS/dos/content/Content.aspx?menu_id=6831, 2016.
- [9] M. Dorotic, T. H. A. Bijmolt, P. C. Verhoef, *Loyalty programs: Current knowledge and research directions*, International Journal of Management Reviews, **14**(3) (2012), 217–237.
- [10] A. Gandomi, S. Zolfaghari, *Profitability of loyalty reward programs: An analytical investigation*, Omega, **41**(4) (2013), 797–807.
- [11] C. Gronroos, *A service perspective on business relationships: The value creation, interaction and marketing interface*, Industrial Marketing Management, **40**(2) (2011), 240–247.
- [12] S. Gupta, D. R. Lehmann, *Customers as assets*, Journal of Interactive Marketing, **17**(1) (2003), 9–24.
- [13] V. Kumar, *Customer relationship management: Marketing strategy*, Pub: John Wiley & Sons, Wiley International Encyclopedia of Marketing, 2010.
- [14] R. Lacey, J. Z. Sneath, *Customer loyalty programs: Are they fair to consumers?* Journal of Consumer Marketing, **23**(7) (2006), 458–464.

- [15] P. D. Liu, F. Jin, *The trapezoid fuzzy linguistic Bonferroni mean operators and their application to multiple attribute decision making*, *Scientia Iranica E*, **19**(6) (2012), 1947–1959.
- [16] M. Maleki, D. Anand, *The critical success factors in customer relationship management implementation*, *Journal of Marketing & Communication*, **4** (2008), 67–80.
- [17] Market Intelligence and Consulting Institute, http://mic.iii.org.tw/micnew/Industryobservation_MIC01views.aspx?type=4&year=2015, 2016.
- [18] L. Meyer-Waarden, C. Benavent, *Grocery retail loyalty program effects: Self-selection or purchase behavior change?*, *Journal of the Academy of Marketing Science*, **37**(3) (2009), 345–358.
- [19] A. Mimouni-Chaabane, P. Volle, *Perceived benefits of loyalty programs: Scale development and implications for relational strategies*, *Journal of Business Research*, **63**(1) (2010), 32–37.
- [20] A. Pérez, I. R. Bosque, *An integrative framework to understand how CSR affects customer loyalty through identification, emotions and satisfaction*, *Journal of Business Ethics*, **129**(3) (2014), 571–584.
- [21] R. D. Raut, V. C. Mahajan, *A new strategic approach of fuzzy-quality function deployment and analytical hierarchy process in construction industry*, *International Journal of Logistics Systems and Management*, **20**(2) (2015), 260–290.
- [22] X. X. Shen, K. C. Tan, M. Xie, *The implementation of quality function deployment based on linguistic data*, *Journal of Intelligent Manufacturing*, **12** (2001), 65–75.
- [23] A. Stathopoulou, G. Balabanis, *The effects of loyalty programs on customer satisfaction, trust, and loyalty toward high- and low-end fashion retailers*, *Journal of Business Research*, **69**(2016), 5801–5808.
- [24] S. Tanford, *The impact of tier level on attitudinal and behavioral loyalty of hotel reward program members*, *International Journal of Hospitality Management*, **34** (2013), 285–294.
- [25] C. Temponi, J. Yen, W. A. Tiao, *House of quality: A fuzzy logic-based requirements analysis*, *European Journal of Operational Research*, **117** (1999), 340–354.
- [26] E. Tolga, M. L. Demircan, C. Kahraman, *Operating system selection using fuzzy replacement analysis and analytical hierarchy process*, *International Journal of Production Economics*, **97**(1) (2005), 89–117.
- [27] P. C. Verhoef, *Understanding the effect of customer relationship management efforts on customer retention and customer share development*, *Journal of marketing*, **67**(4) (2003), 30–45.
- [28] T. C. Wang, Y. H. Chen, *Applying consistent fuzzy preference relations to partnership selection*, *Omega*, **35** (2007), 384–388.
- [29] T. C. Wang, Y. H. Chen, *Applying fuzzy linguistic preference relations to the improvement of consistency of fuzzy AHP*, *Information Sciences*, **178** (2008), 3755–3765.
- [30] Y. J. Wang, *A criteria weighting approach by combining fuzzy quality function deployment with relative preference relation*, *Applied Soft Computing*, **14** (2014), 419–430.
- [31] S. Wang, H. Cavusoglu, Z. Deng, *Early mover advantage in e-commerce platforms with low entry barriers: The role of customer relationship management capabilities*, *Information & Management*, **53** (2016), 197–206.
- [32] Y. Wang, K. A. Jung, G. T. Yeo, C. C. Chou, *Selecting a cruise port of call location using the fuzzy-AHP method: A case study in East Asia*, *Tourism Management*, **42** (2014), 262–270.
- [33] J. Wirtz, A. S. Mattila, M. O. Lwin, *How effective are loyalty reward programs in driving share of wallet?* *Journal of Service Research*, **9**(4) (2007), 327–334.
- [34] R. Yakimova, F. Mavondo, S. Freeman, *Brand champion behaviour: Its role in corporate branding*, *Journal of Brand Management*, **24** (2017), 575.
- [35] H. B. Yan, T. Ma, *A group decision-making approach to uncertain quality function deployment based on fuzzy preference relation and fuzzy majority*, *European Journal of Operational Research*, **241** (2015), 815–829.

Archive of SID

- [36] L. A. Zadeh, *Fuzzy sets*, Information and Control, **8** (1965), 338–353.
- [37] L. A. Zadeh, *The concept of a linguistic variable and its application to approximate reasoning–Part I*, Information Sciences, **8** (1975), 199–249.
- [38] Y. Zhu, S. Freeman, S. T. Cavusgil, *Service quality delivery in a cross-national context*, International Business Review, **27** (2018), 1022–1032.

Customer loyalty program based on quality function deployment with fuzzy linguistic preference relation

T. H. Hsu, L. Z. Lin and S. Y. Chiu

استراتژی بازاریابی سازمان یافته مشتری بر اساس گسترش تابع کیفیت با رابطه اولویت زبان شناختی فازی

چکیده. رقابت در بین مراکز خرید به شدت در حال افزایش است. به منظور بالا بردن سطح همیاری رقابتی و سودمند بودن، چگونگی حفظ مشتریان عمده ثابت، یک موضوع مهم برای مدیریت‌های مراکز خرید شده است. استراتژی بازاریابی سازمان یافته مشتری یک عرف جهانی است. این تحقیق یک مدل تحلیلی برای گسترش مدیریت استراتژیک استراتژی بازاریابی سازمان یافته مشتری پیشنهاد می‌کند. مدل ما یک ماتریس رابطه‌ای فازی جهت کامل کردن منافع مشتری و استراتژی بازاریابی سازمان یافته مشتری بر اساس گسترش تابع کیفیت می‌سازد. نتایج به درک بهتر از اهمیت‌های مختلف منافع مشتری نسبت به «منافع سودمندگرایی»، «منافع خوشی و لذت» و «منافع نمادین» کمک می‌کند. یافته‌های تحقیق، استراتژی بازاریابی سازمان یافته مشتری اولویت‌بندی شده را، که شامل «جدیدترین انتقالات اطلاعات» «متخصصین خدمات ارتباطات» «ترویج هدیه آزاد انحصاری» و «سرویس سالن استراحت VIP» که می‌توان جهت تعیین مدیریت‌ها برای بهبودی مراکز خرید بکار برده شود، فراهم می‌آورد. این تحقیق برای تئوری و شاغلین دارای مفهوم است. ابتدا، در استراتژی بازاریابی سازمان یافته مشتری یکپارچگی منافع مشتری و ملاحظه مشتری‌های VIP در برنامه‌ها را می‌پذیرد. دوم هنگام مواجهه با عدم قطعیت و ابهامات برای اولویت‌بندی استراتژی بازاریابی سازمان یافته مشتری، ارزیابی تقاضا را با توجه به اولویت‌های زبان شناختی فازی می‌پذیرد. نهایتاً، این روش با ادغام تصمیم‌گیری فازی در QFD، در بدست آوردن نتایج واقعی بیشتری کمک می‌کند.